MUSKOX NUMBERS AND DISTRIBUTION IN THE NORTHWEST TERRITORIES, 1997

Northwest Territories Resources, Wildlife & Economic Development

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AND

A. GUNN

DEPARTMENT OF RESOURCES, WILDLIFE AND ECONOMIC DEVELOPMENT

GOVERNMENT OF THE NORTHWEST TERRITORIES

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ABSTRACT

Recent and historic survey data on muskox population numbers were graphed in order to identify possible trends. Survey areas were mapped along with muskox management units. Biologists responsible for the surveys and reports are identified and are the source for comments on trends in numbers and distribution. Recent sightings illustrate the recolonization of the historic range of muskox. The most recent changes to muskox management units and quotas are provided in the appendix.

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INTRODUCTION

Muskoxen (*Ovibos moschatus*) in the Northwest Territories have continued to recolonize their historic ranges. We have mapped sightings to illustrate this recolonization (Fig. 1) and a detailed analysis will be pursued in a subsequent report to measure the rate of recolonization where there are data.

Economic opportunities from hunting muskoxen have increased considerably. Most of the surveys which revealed population increases were followed by legislation changes to increase quotas and extend the size and number of muskox management units. Muskox quotas began in 1969 and, by 1979, numbered 252 muskox tags for 10 communities. In 1983, 12 communities had 2313 tags available and by 1997 available quotas had reached 12 905. Muskox management units (Fig. 2) reflect local hunting areas, convenient geographic boundaries and survey areas (Fig.3) rather than population boundaries.

Recent population estimates for muskoxen are not all readily available as some are awaiting publication. As part of the departmental preparations for Nunavut and because we often have requests for muskox numbers, we have compiled current information on population size, areas surveyed and muskox management units. This report updates previous compilations (Ferguson and Gauthier 1992, Case *et al.* 1989). Table 1 is a summary of the most recent population estimates for the Northwest Territories.

In this compilation, we have graphed the population estimates (and

their standard errors), although we recognize that, particularly for estimates prior to the mid-1980s, survey design was not standardised and trend information is not always reliable (Figs. 4-42). Each figure containing graphed estimates is accompanied by a map of the areas surveyed and the associated muskox management unit/s (Figs. 4-42). We have not listed survey methods as those details can be found in the individual survey reports. Those reports also contain discussions of statistical significance and population trends.

Co-operative research between the Department of Resources, Wildlife and Economic Development and Queens University is currently underway to investigate the genetic variation across muskox ranges in the NWT. Those results will contribute to evaluating the genetic basis for populations.

This report is a compilation intended as an update and not the final word. The biologists responsible for the surveys and reports are identified and are the source for comments on trends in muskox numbers or distribution.

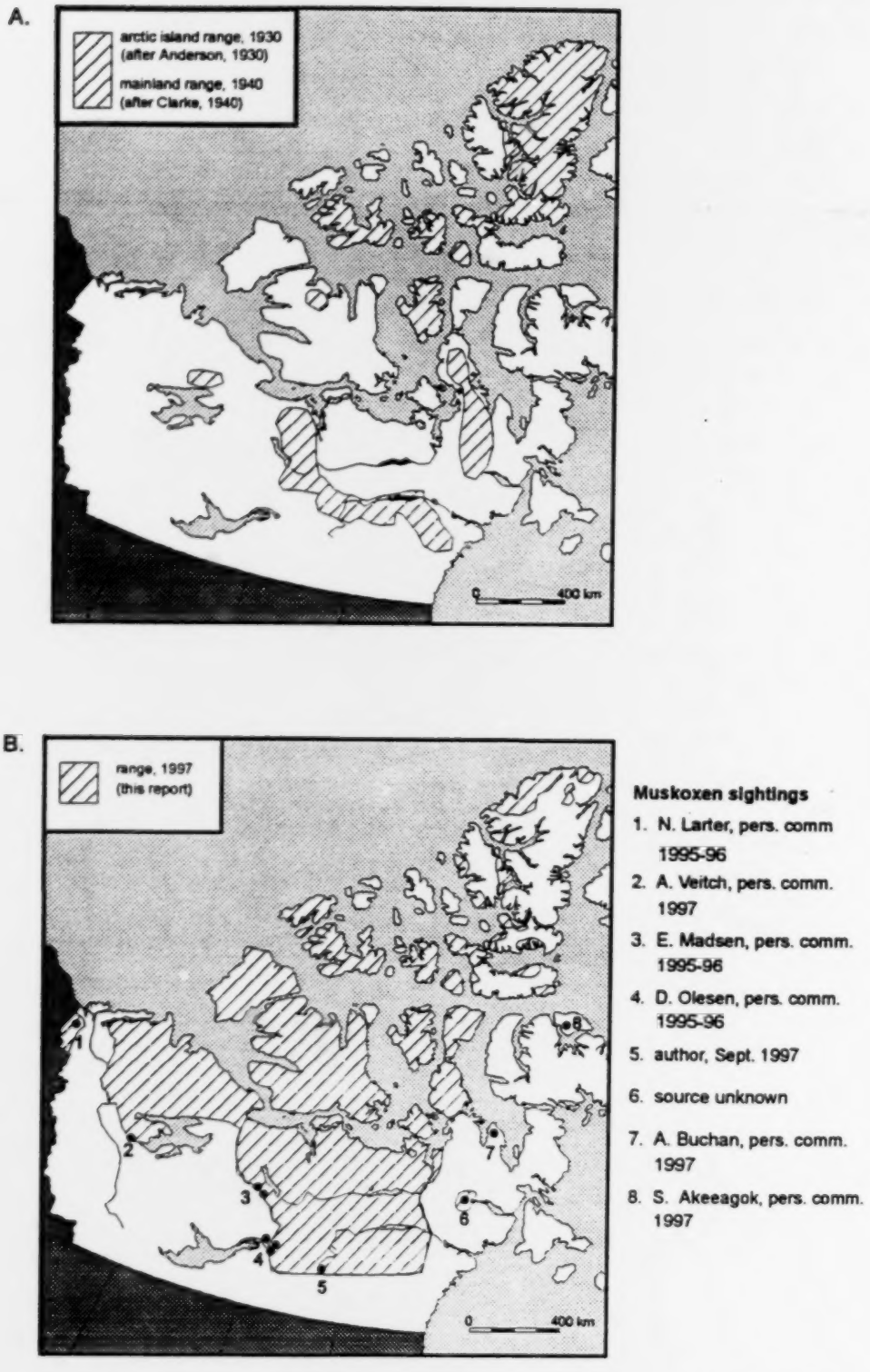


Figure 1. Muskox range in the Northwest Territories, (A) 1930 and 1940 (Barr, 1991) and (B) 1997.

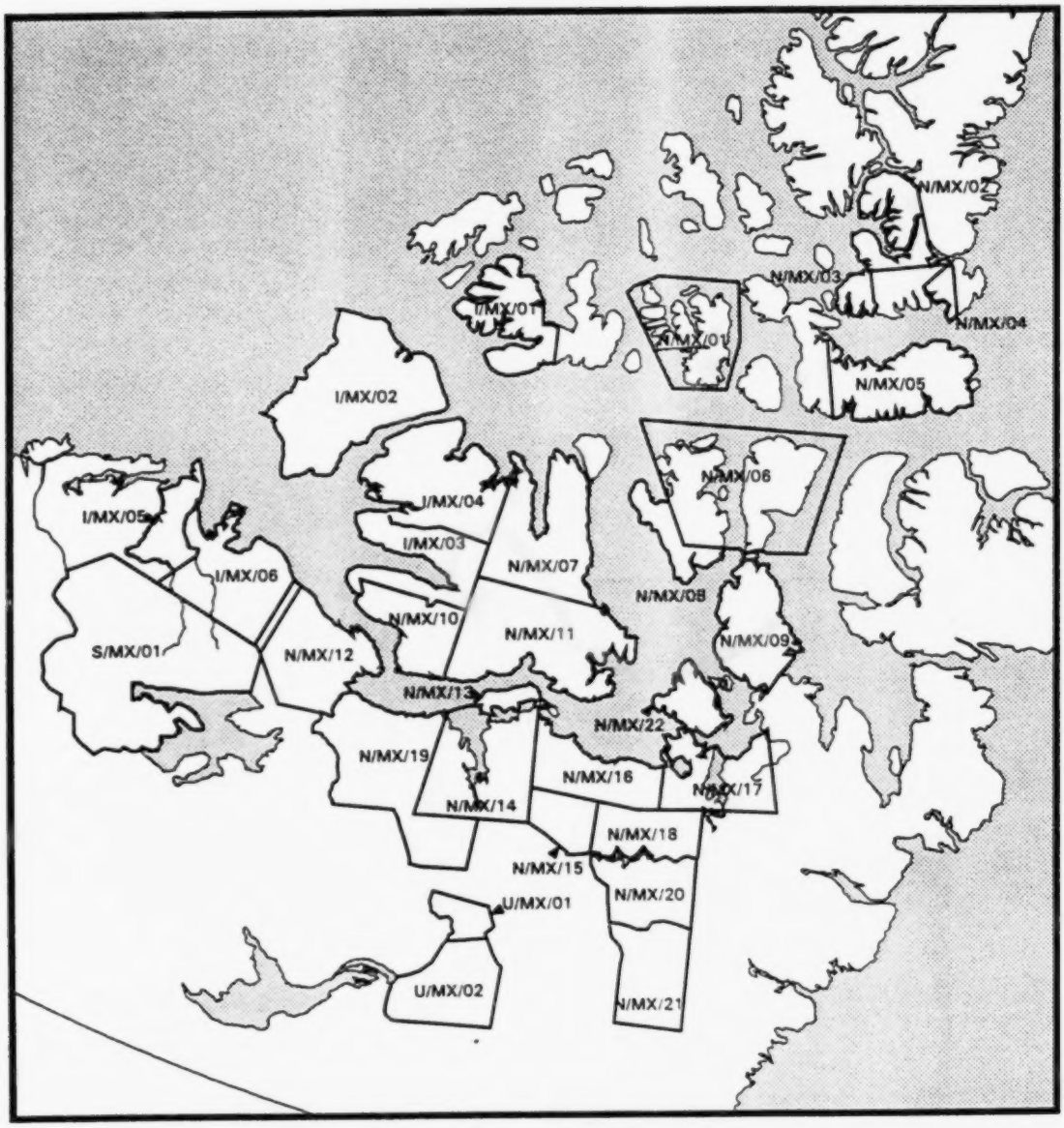


Figure 2. Muskox management zones, December, 1996.

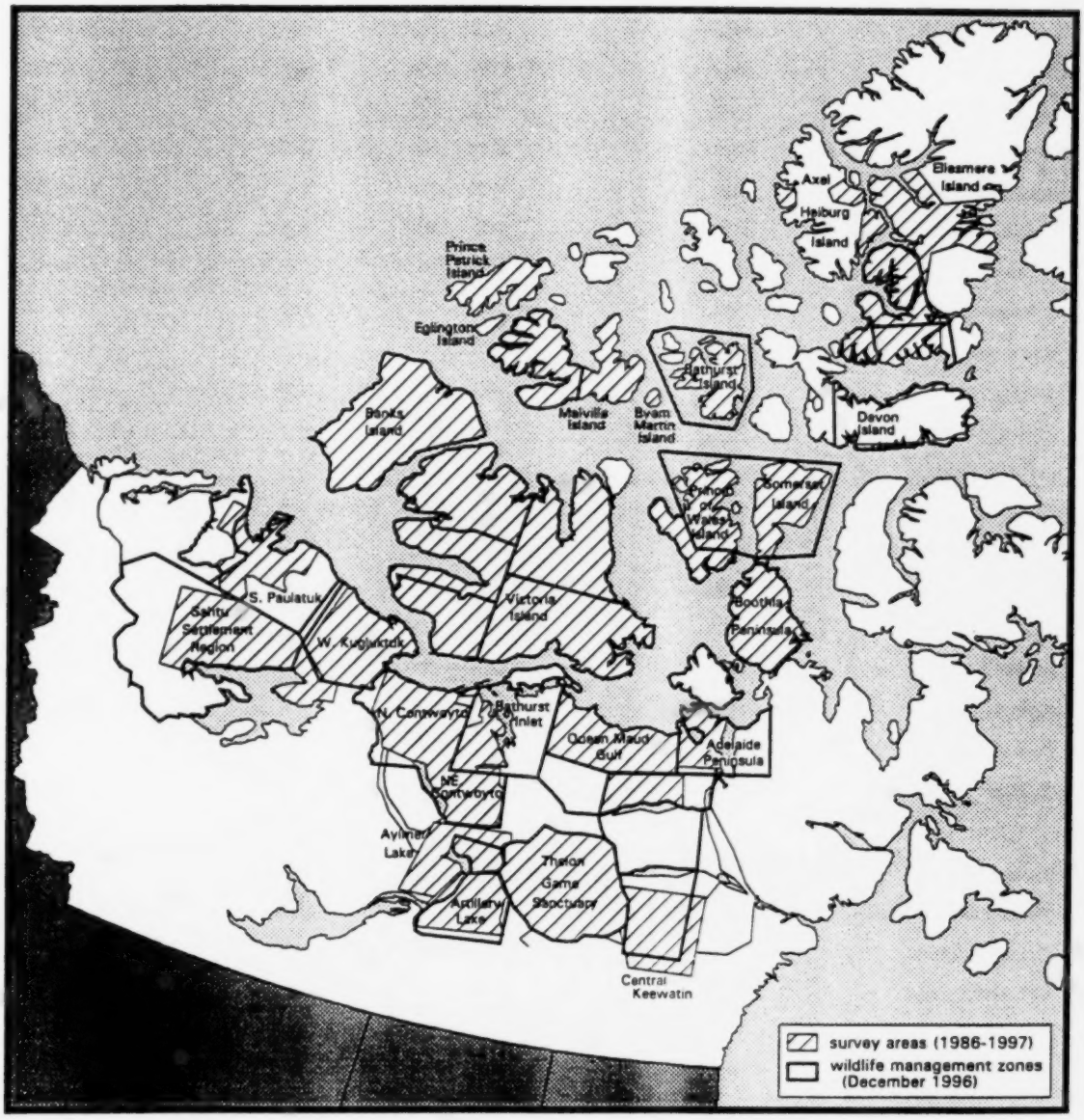
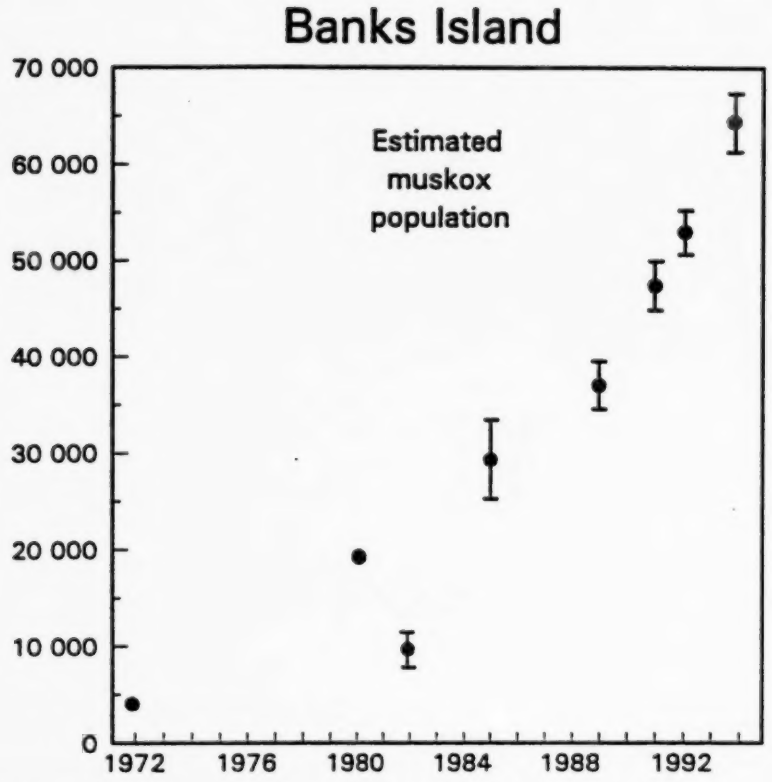


Figure 3. Muskox survey areas, 1986 - 1997.

Table 1. Total estimated muskox population in the Northwest Territories, 1997.

Area surveyed	Survey year	Estimated population ± SE	Quota	Management zone
Sahtu Settlement Region	1997	1457 ± 919	11	S/MX01
S. Paulatuk	1987	3040 ± 1296	50	I/MX/06
W. Kugluktuk	1994	974 ± 336	20	N/MX/12
N. Contwoyto	1991	1400	60	N/MX/19
N.E. Contwoyto	1986	1216 ± 353	60	N/MX/19
Bathurst Inlet	1986	2192 ± 494	40	N/MX/14
Queen Maud Gulf	1996	4255 ± 680	170	N/MX/16
Adelaide Peninsula	1992	1165 ± 380	55	N/MX/17
Boothia Peninsula	1995	555 ± 205	10	N/MX/09
C. Keewatin	1991	1048 ± 141	25	N/MX/21
Aylmer Lake	1991	161 ± 39	4	U/MX/01
Artillery Lake	1989	563 ± 154	14	U/MX/02
Thelon Game Sanctuary	1994	1095 ± 281	-	-
mainland total:		19 121 ±1944		
Banks Island	1994	64 680 ± 2009	10 000	I/MX/02
Prince Patrick Island	1997	124 ± 65	-	-
Bathurst Island	1997	126 ± 45	40	N/MX/01
Byam Martin Island	1997	0	-	-
Melville Island	1997	2230 ± 308	6	I/MX/01
Eglington Island	1997	37 ± 21	-	-
Axel Heiburg Island	1995	156(count)	-	-
S. Ellesmere Island	1991	2020 ± 285	60, 10, 4	N/MX/02, N/MX/03, N/MX/04
Devon Island	1990	400	15	N/MX/05
Prince of Wales Island	1995	5259 ± 414	12, 20	N/MX/08, N/MX/06
Somerset Island	1995	1140 ± 260	20	N/MX/06
N.E. Victoria Island	1992	6720 ± 790	100	N/MX/07
N.W. Victoria Island	1994	19 989 ± 3786	250, 750	I/MX/03, I/MX/04
S.E. Victoria Island	1993	13 180 ± 1279	1000	N/MX/11
S.W. Victoria Island	1994	3934 ± 1225	100	N/MX/10
island total:		119 995 ± 4749		
NWT total:		139 116 ± 5131		



Muskox Management Zone - I/MX/02
Quota: 10 000

	Population estimate	S.E.	C.V.	% coverage	% calves
1972[1]	3800	-	-	-	-
1980[2]	19 328	-	-	25.7	-
1982[3]	9393	1054	0.11	12.5-50	-
1985[4]	29 294	4132	0.08	15.5	11.8
1989[5]	37 046	2429	0.07	10-20	14.5
1991[6]	47 374	2497	0.05	-	14.0
1992[7]	52 959	2240	0.04	-	17.1
1994[8]	64 680	2009	0.03	40	-

[1] Urquhart, 1973
[2] Vincent and Gunn, 1981
[3] Latour, 1985
[4] McLean et al., 1986
[5] McLean and Fraser, 1992
[6] Fraser et al., 1992
[7] Nagy et al., 1996
[8] Nagy, pers. comm. (unpubl. data)

Figure 4. Banks Island muskox population trend.

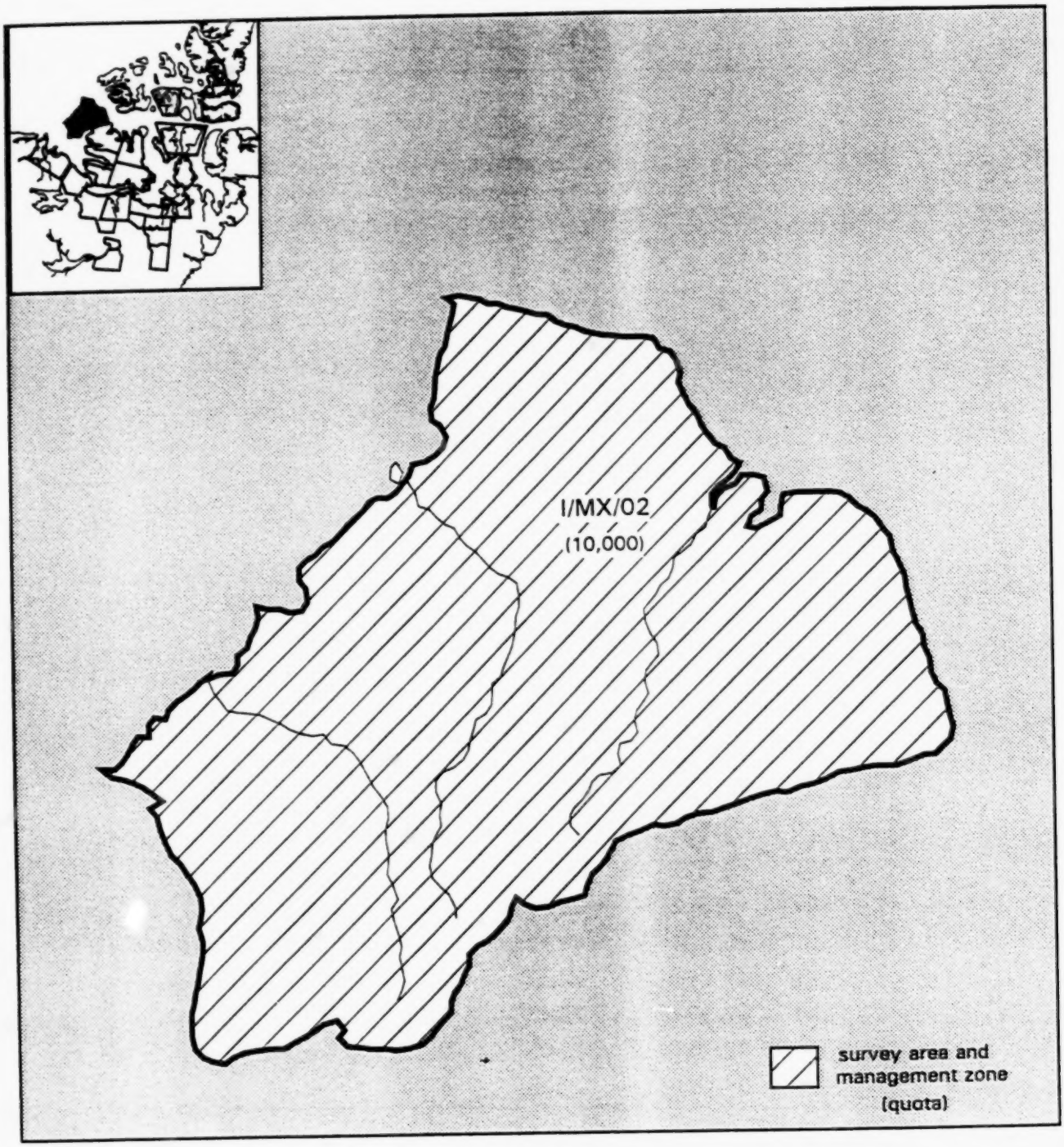
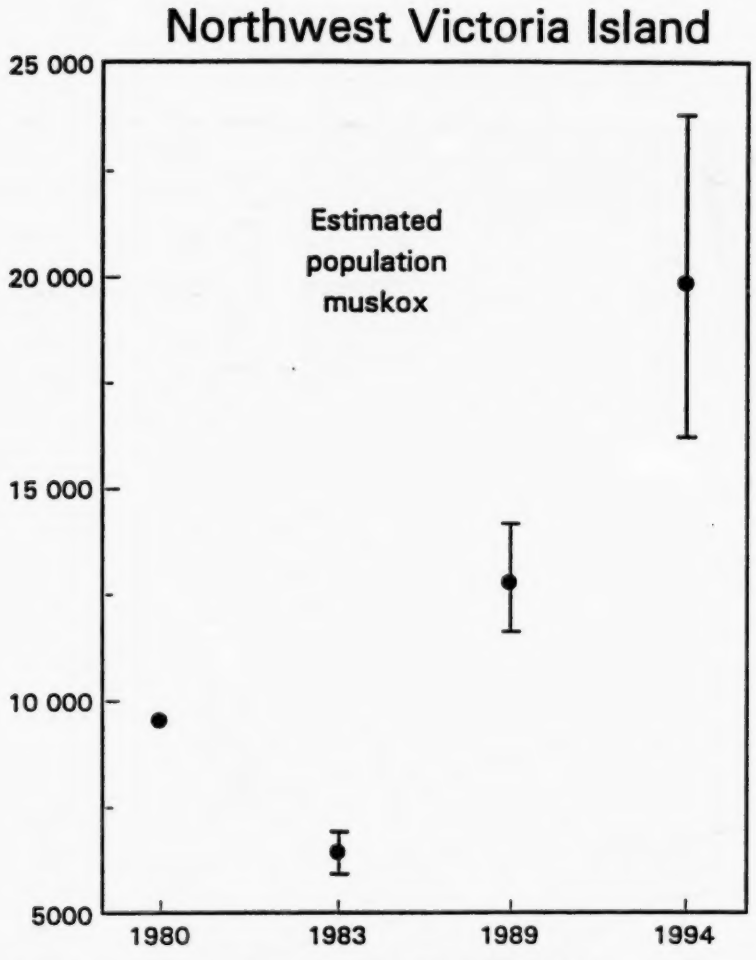


Figure 5. Banks Island survey area, 1972-1994.



Muskox Management Zone - I/MX/03, I/MX/04
Quota: 250, 750

	Population estimate	S.E.	C.V.	% coverage	% calves
1980 [1]	9540	-	-	-	27.4
1983 [2]	6430	498	0.08	11.3	15.6
1989 [3]	12 850	1260	0.10	10-30	9.8
1994 [4]	19 989	3786	0.19	10.2	-

[1] Jakimchuk and Carruthers, 1980

[2] Jingfors, 1985 - used different stratification from Jakimchuk and Carruthers (1980).

[3] Heard, 1992 - used same stratification as Jingfors (1985).

[4] Nishi, in prep.a. - slightly different boundaries for study area and stratification from Jingfors (1985).

Figure 6. Northwest Victoria Island muskox population trend.

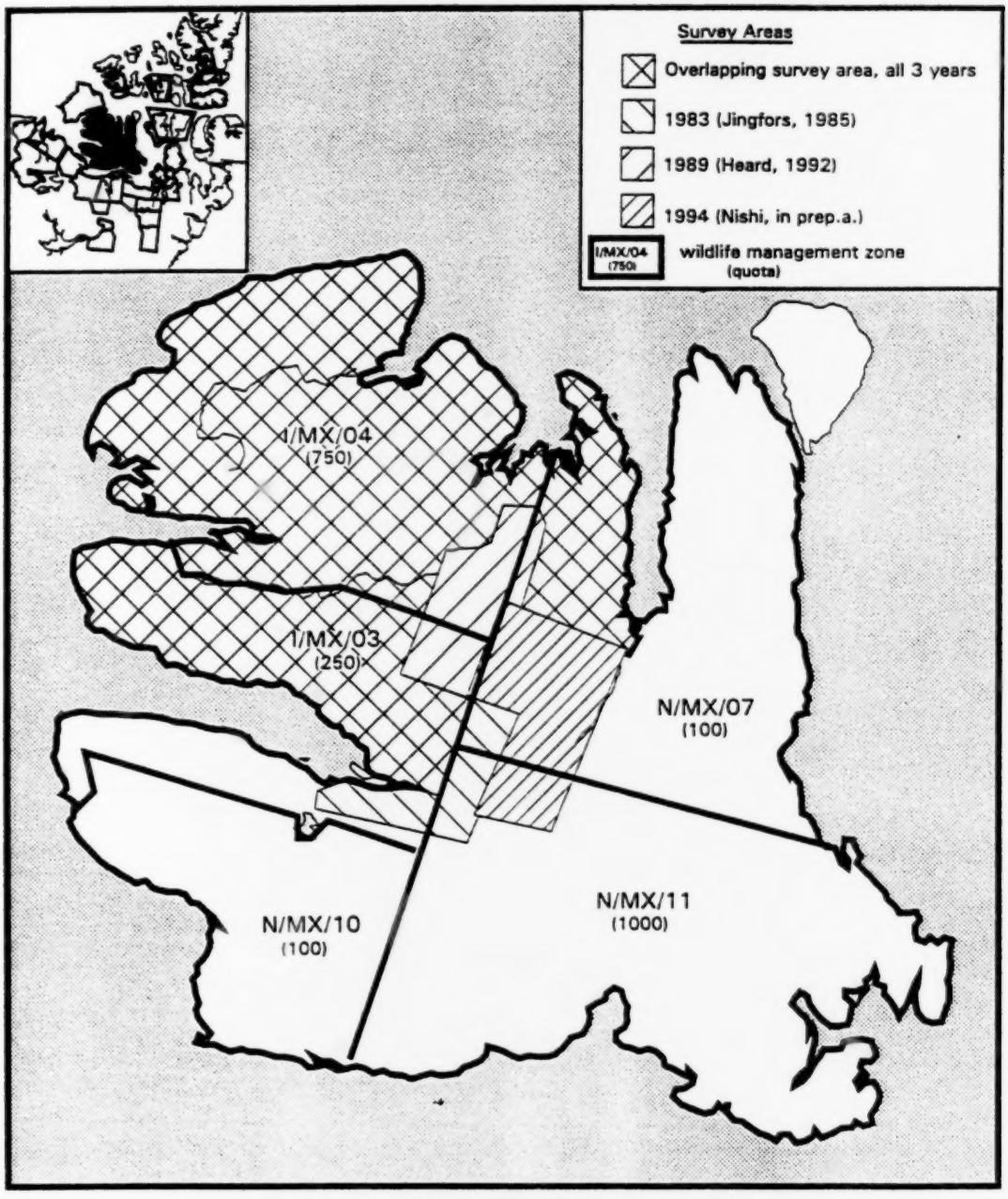
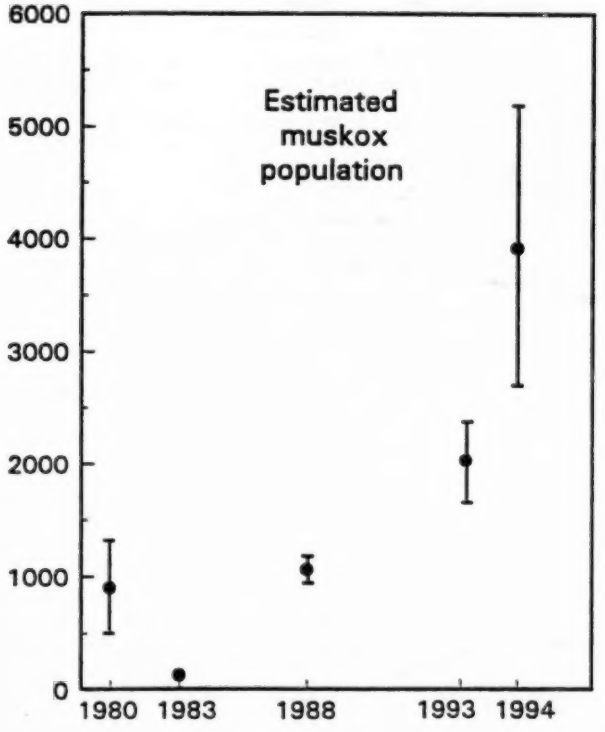


Figure 7. Northwest Victoria Island survey areas.

Southwest Victoria Island



Muskox Management Zone - N/MX/10
Quota: 100

	Population estimate	S.E.	C.V.	% coverage
1980 [1]	896	387	0.43	6.35
1983 [2]	135	51	0.38	19.5
1988 [3]	1072	129	0.12	20.0
1993 [3]	2008	356	0.18	13-20
1994 [4]	3934	±1225	0.32	10.1

[1]Jakimchuk and Carruthers, 1980

[2]Poole, 1985

[3]Gunn, in prep. a.

[4]Nishi, in prep. - part of a larger survey of western Victoria Island (Stratum I).

Figure 8. Southwest Victoria Island muskox population trend.

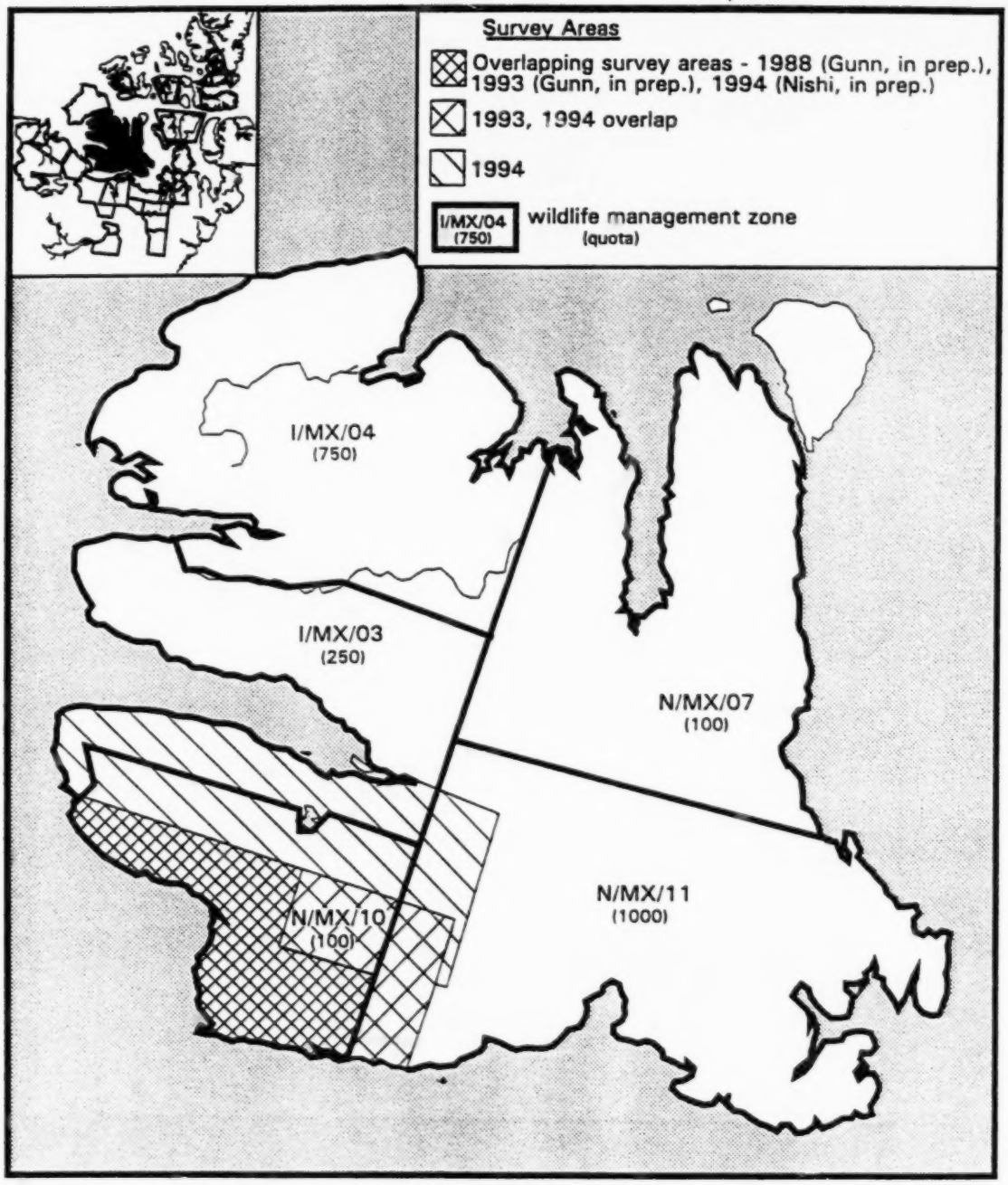
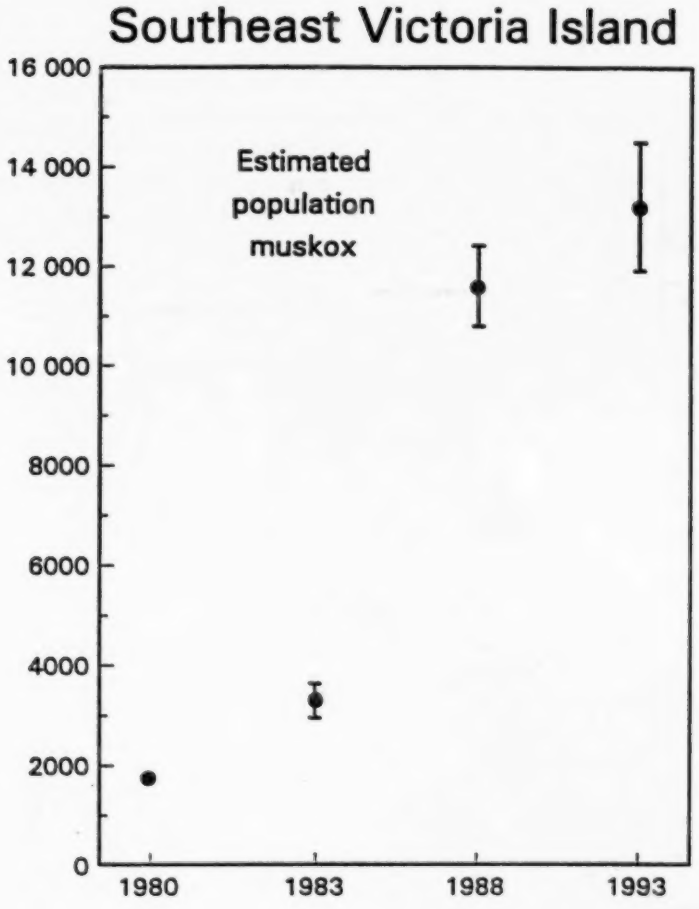


Figure 9. Southwest Victoria Island survey areas.



Muskox Management Zone - N/MX/11
Quota: 1000

	Population estimate	S.E.	C.V.	% coverage	% calves
1980[1]	1760	-	-	-	27.4
1983[2]	3300	345	0.08	20.0	16.1-23.1
1988[3]	11 595	799	0.06	30.6	-
1993[4]	13 180	1279	0.09	19.5	-

[1]Jakimchuk and Carruthers, 1980 - part of a larger survey of caribou and muskoxen.
[2]Jingfors, 1985 - non-stratified transect survey.
[3]Gunn, in prep. b. - repeated Jingfors (1985) survey area.
[4]Gunn, in prep. c. - repeated Jingfors (1985) survey area.

Figure 10. Southeast Victoria Island muskox population trend.

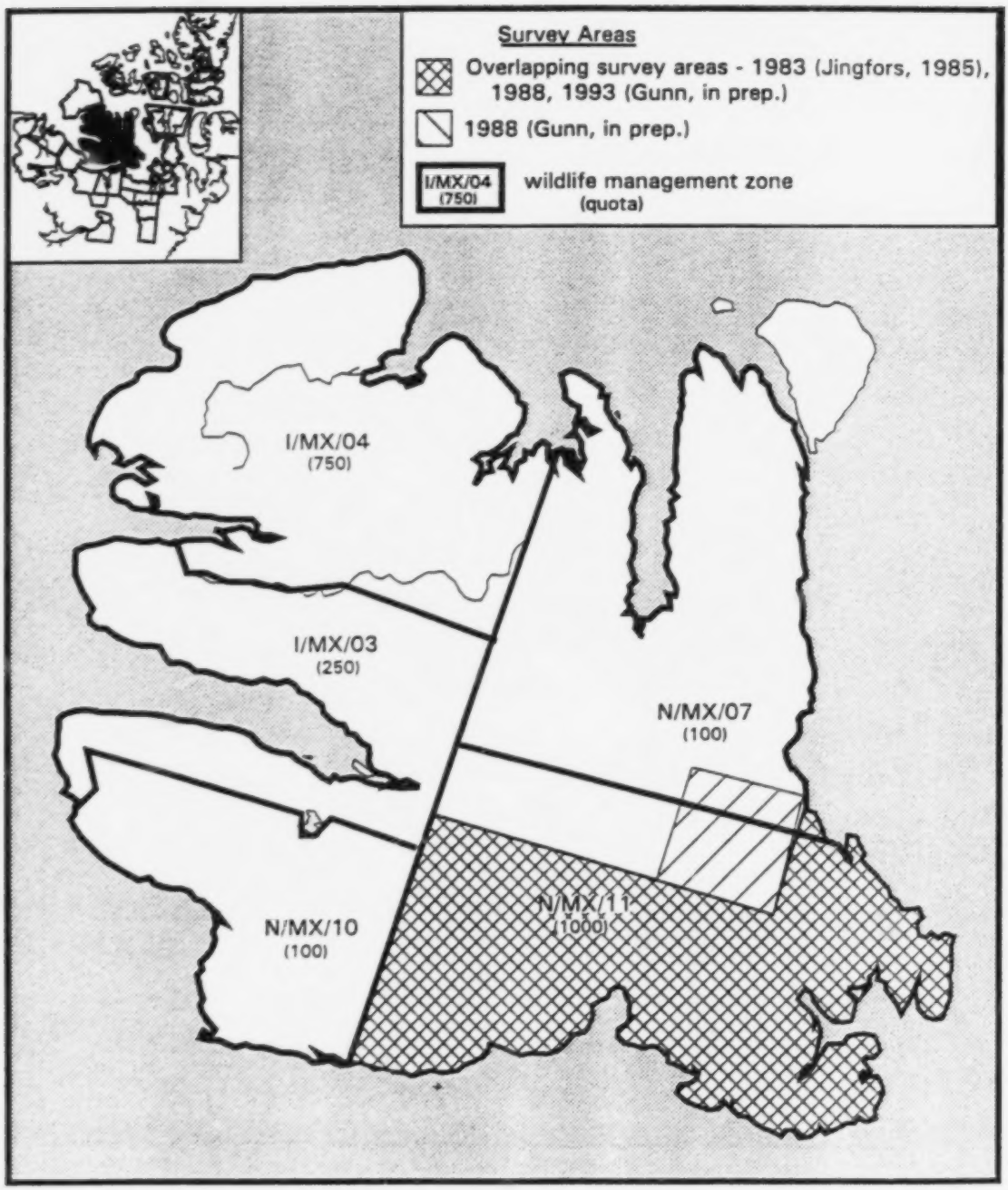


Figure 11. Southeast Victoria Island survey areas.

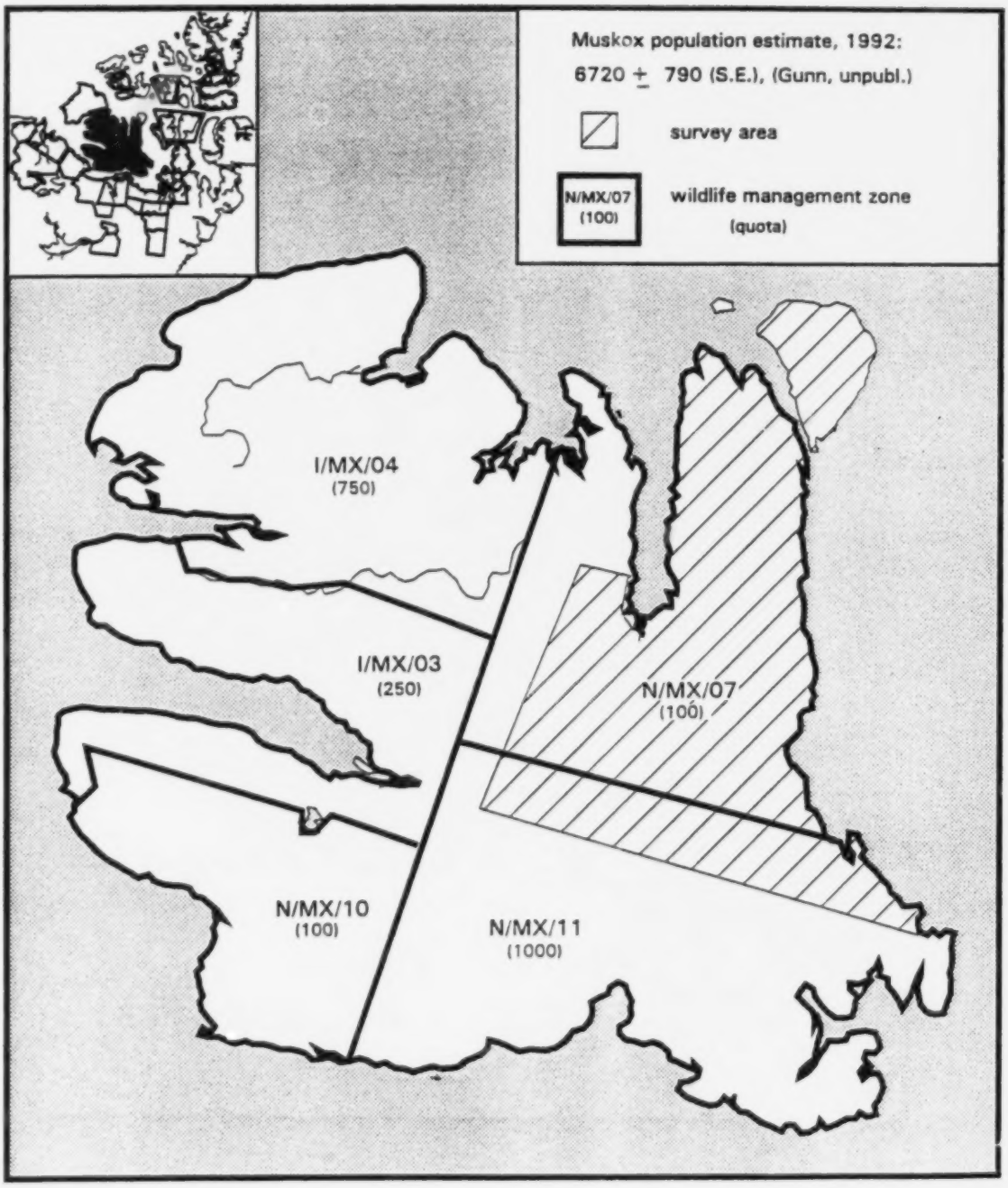
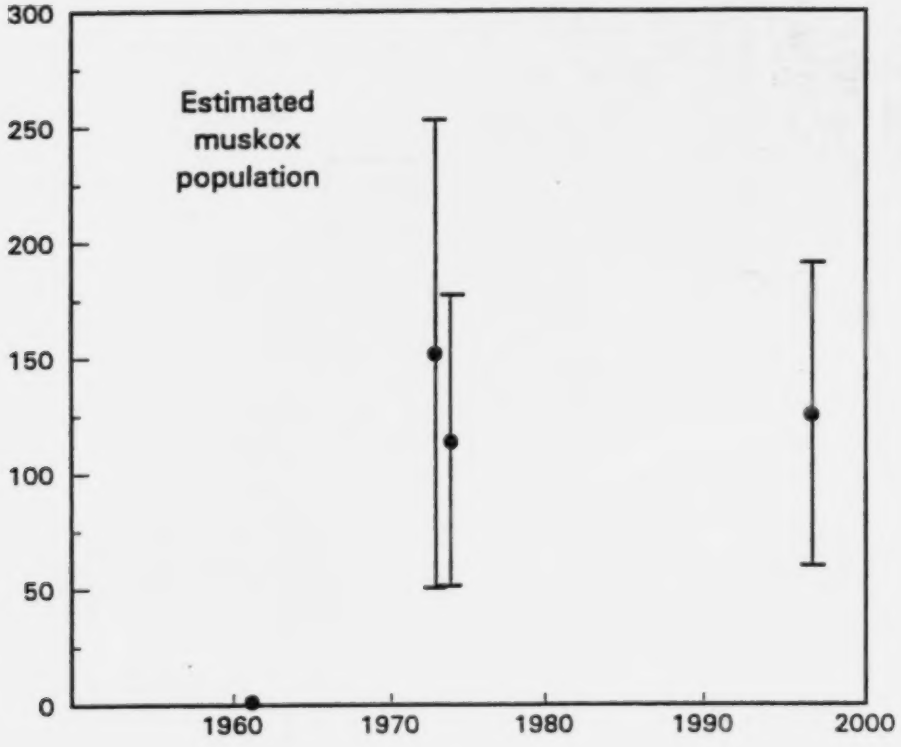


Figure 12. Northeast Victoria Island survey area and population estimate, 1992.

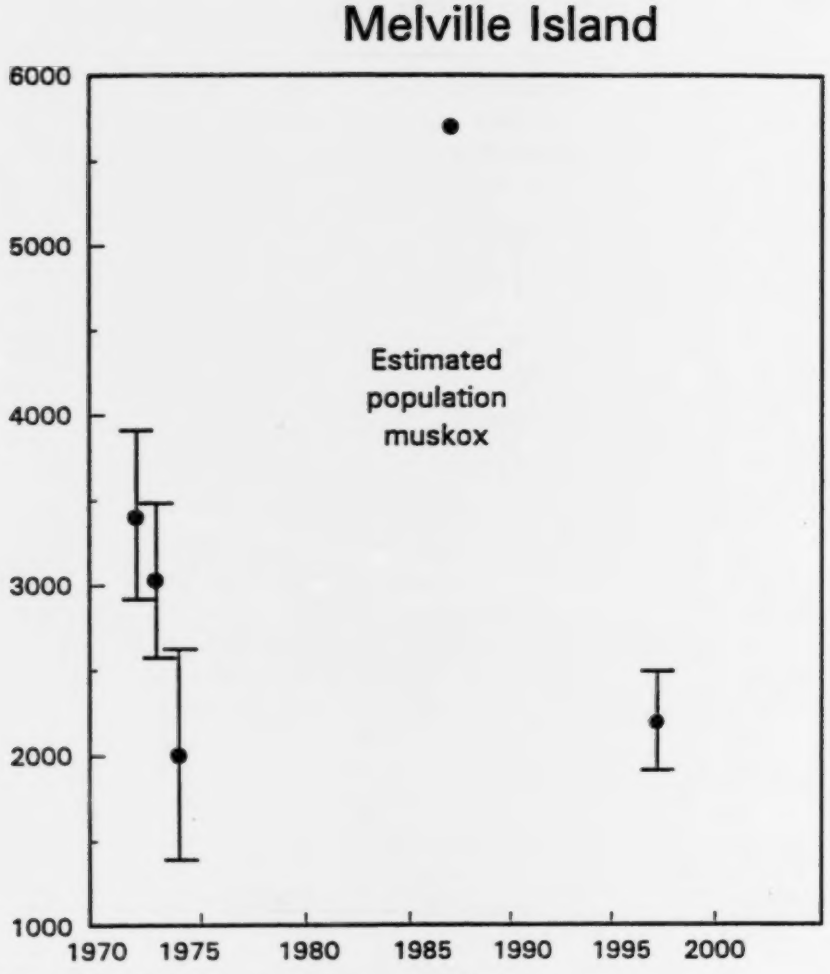
Prince Patrick Island



	Population estimate	S.E.	C.V.	% coverage	% calves
1961[1]	0	-	-	-	-
1973[2]	152	101	0.66	-	16.0
1974[2]	114	63	0.55	-	6.2
1997[3]	124	65	0.52	-	-

[1]Tener, 1963
[2]Miller et al., 1977
[3]Gunn and Dragon, in prep.

Figure 13. Prince Patrick Island muskox population trend.

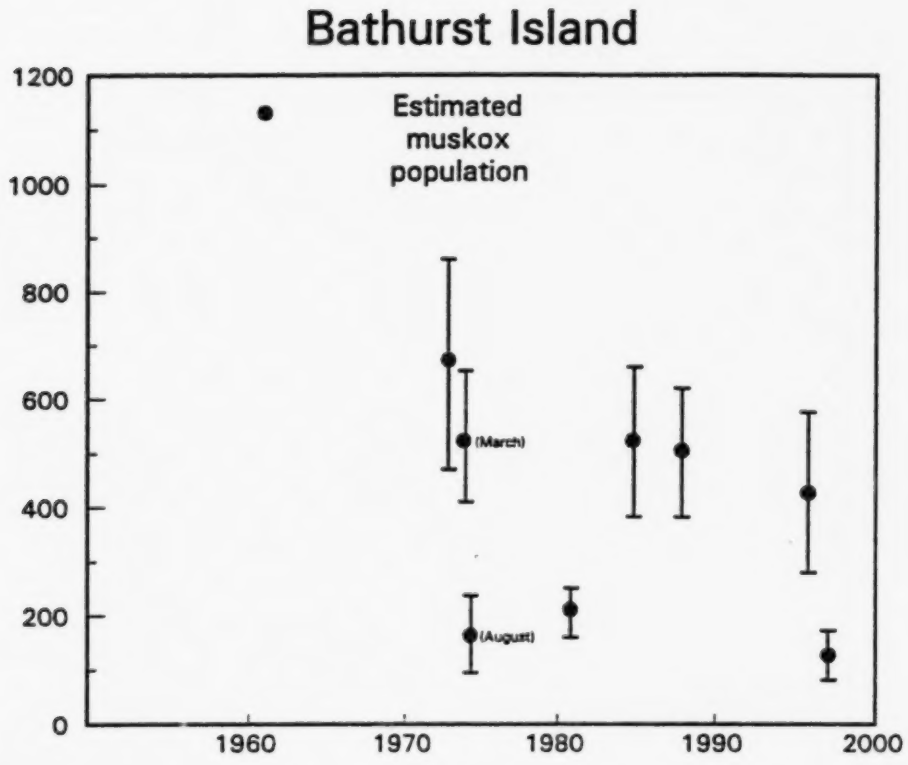


Muskox Management Zone - I/MX/01
Quota: 6

	Population estimate	S.E.	C.V.	% coverage	% calves
1972[1]	3394	478	0.14	-	9.5
1973[1]	3025	455	0.15	-	18.7
1974[1]	1997	588	0.29	-	9.7
1987[2]	5700	-	-	-	-
1997[3]	2229	308	0.14	-	-

[1] Miller et al., 1977
[2] Miller, 1988
[3] Gunn and Dragon, in prep.

Figure 14. Melville Island muskox population trend.



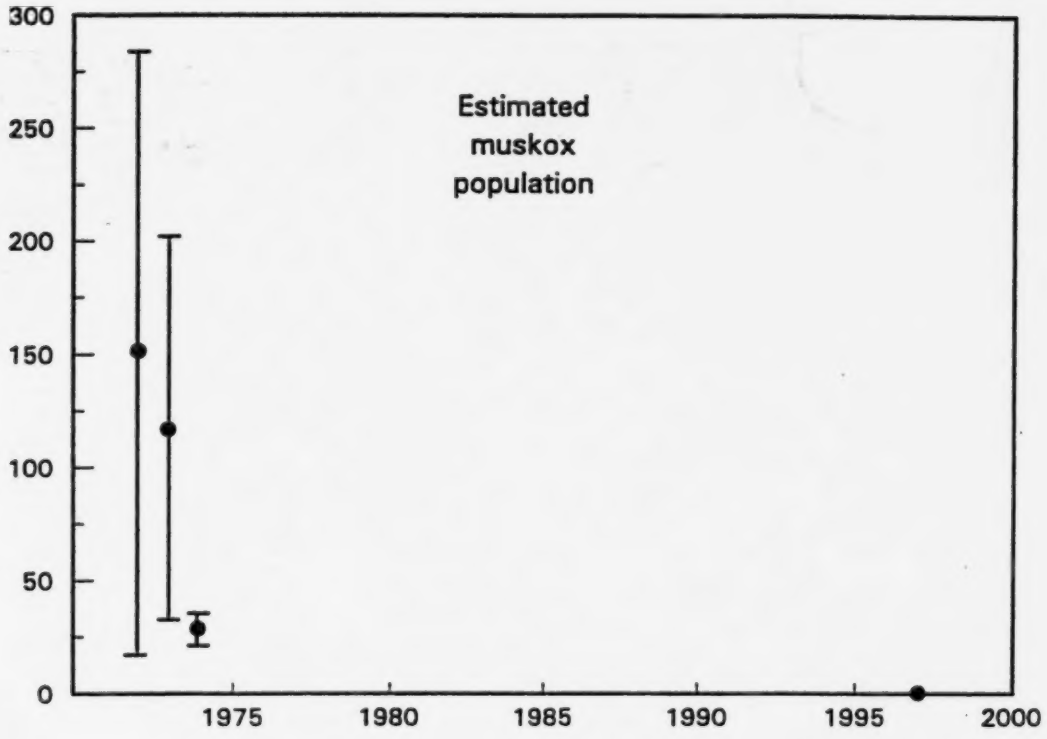
Muskox Management Zone - N/MX/01
Quota: 40

	Population estimate	S.E.	C.V.	% coverage	% calves
1961[1]	1136	-	-	-	-
1973[2]	672	194	0.29	-	-
1974[3]	522	121	0.23	-	-
1974[4]	164	70	0.43	-	-
1981[5]	208	59	0.28	26.8	16
1985[6]	521	145	0.28	27-54	16.7
1988[6]	503	107	0.21	27-54	12.2
1996[7]	425	148	0.35	11.5	0.0
1997[8]	126	45	0.36	-	-

[1] Tener, 1963
[2] Miller et al., 1977
[3] Miller et al., 1977 - March survey
[4] Miller et al., 1977 - August survey
[5] Ferguson, 1991
[6] Miller, 1990
[7] Miller, pers. comm.
[8] Gunn and Dragon, in prep.

Figure 15. Bathurst Island muskox population trend.

Byam Martin Island



	Population estimate	S.E.	C.V.	% coverage	% calves
1972[1]	151	132	0.87	-	7.1
1973[1]	117	84	0.71	-	23.6
1974[1]	28	8	0.24	-	0
1997[2]	0	-	-	-	-

[1]Miller et al., 1977

[2]Gunn and Dragon, in prep.

Figure 16. Byam Martin Island muskox population trend.

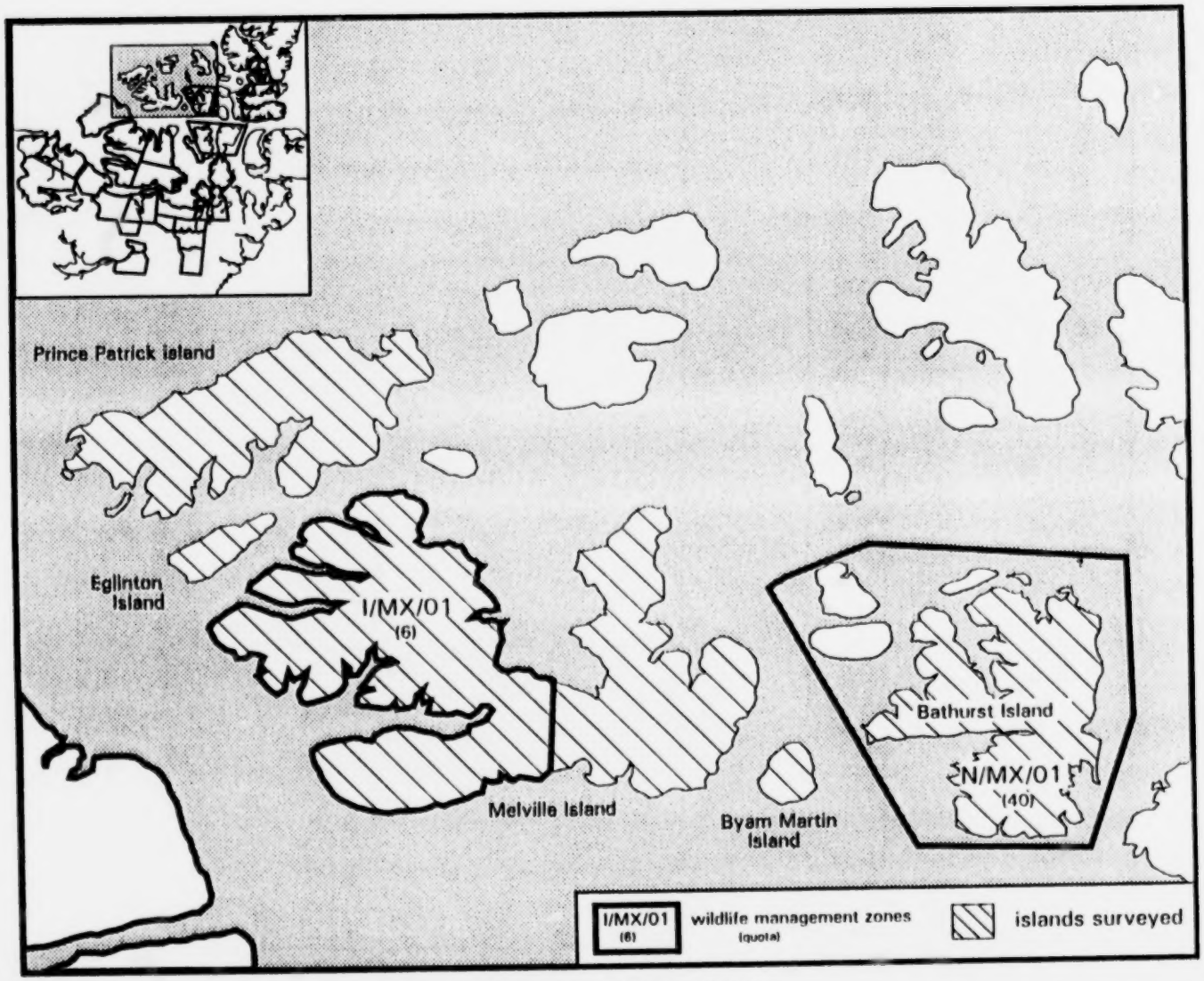
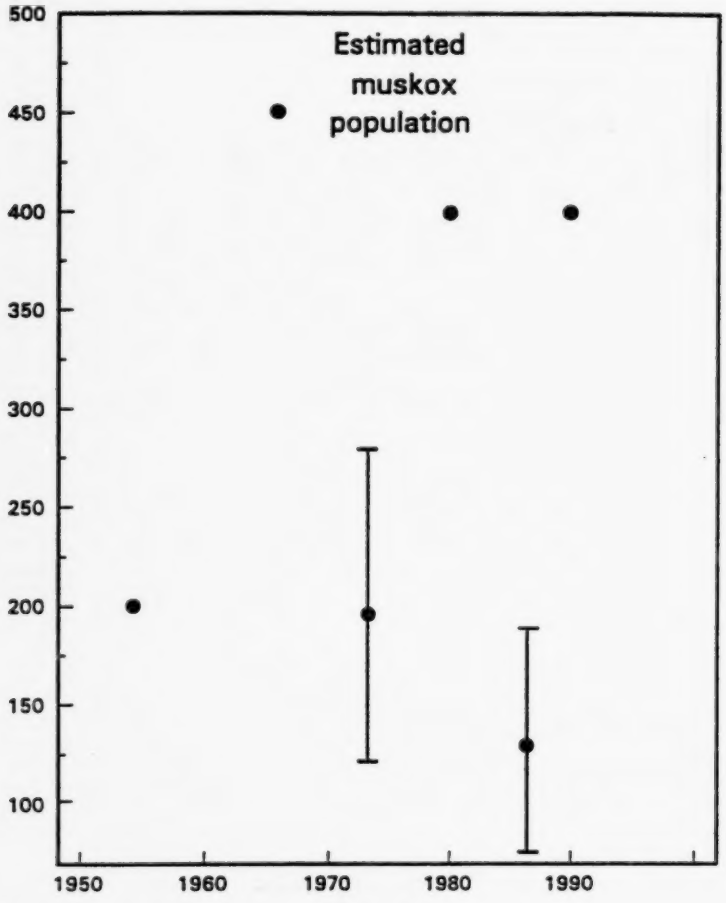


Figure 17. Western Queen Elizabeth Island surveys, 1972 - 1997.

Devon Island

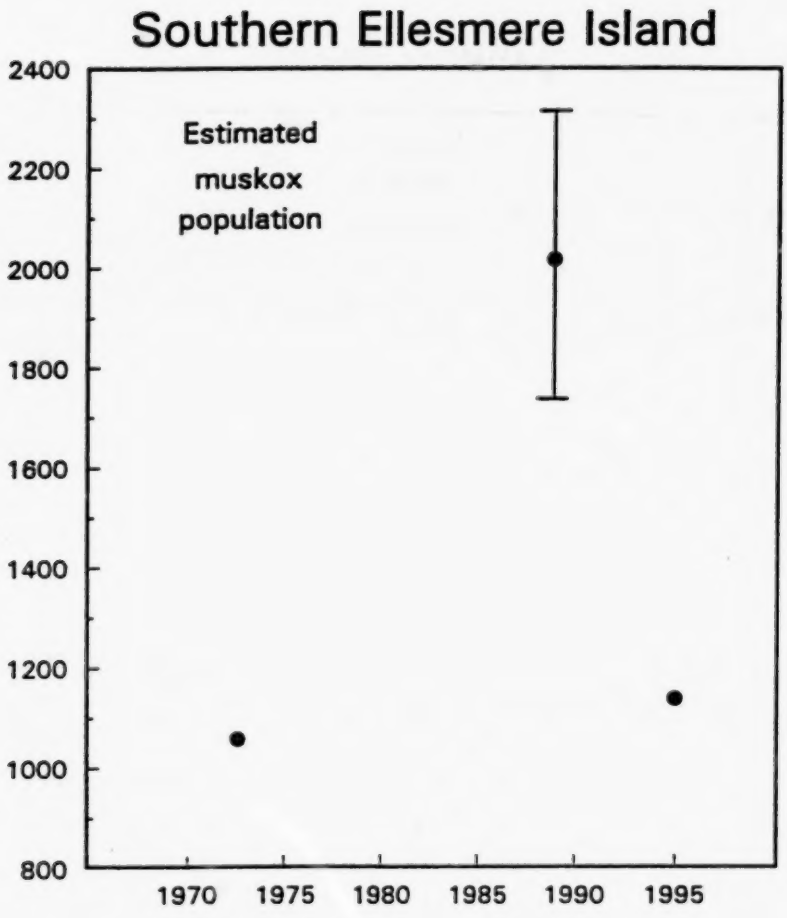


Muskox Management Zone - N/MX/05
Quota: 15

	Pop. estimate	S.E.	C.V.	% coverage	% calves
[1]1950's	200	-	-	-	-
[2]1967	450	-	-	-	-
[3]1970-73	116-278	-	-	-	-
[4]1980	400	-	-	-	-
[5]1984-87	71-188	-	-	-	-
[6]1990	400	-	-	-	12.8

[1] Tener, 1958
[2] Freeman, 1971
[3] Hubert, 1977
[4] Urquhart, 1982
[5] Pattie, 1990
[6] Case, 1992

Figure 18. Devon Island muskox population trend.



Muskox Management Zones - N/MX/02, N/MX/03

Quota: 60, 10

	Population estimate	S.E.	C.V.	% coverage
1973[1]	1060	-	-	-
1989[2]	2020	285	0.14	-
1995[3]	1147 (count)	-	-	-

[1] Riewe, 1973

[2] Case and Ellsworth, 1991 - surveyed larger area

[3] Gauthier, 1996

Figure 19. Southern Ellesmere Island muskox population trend.

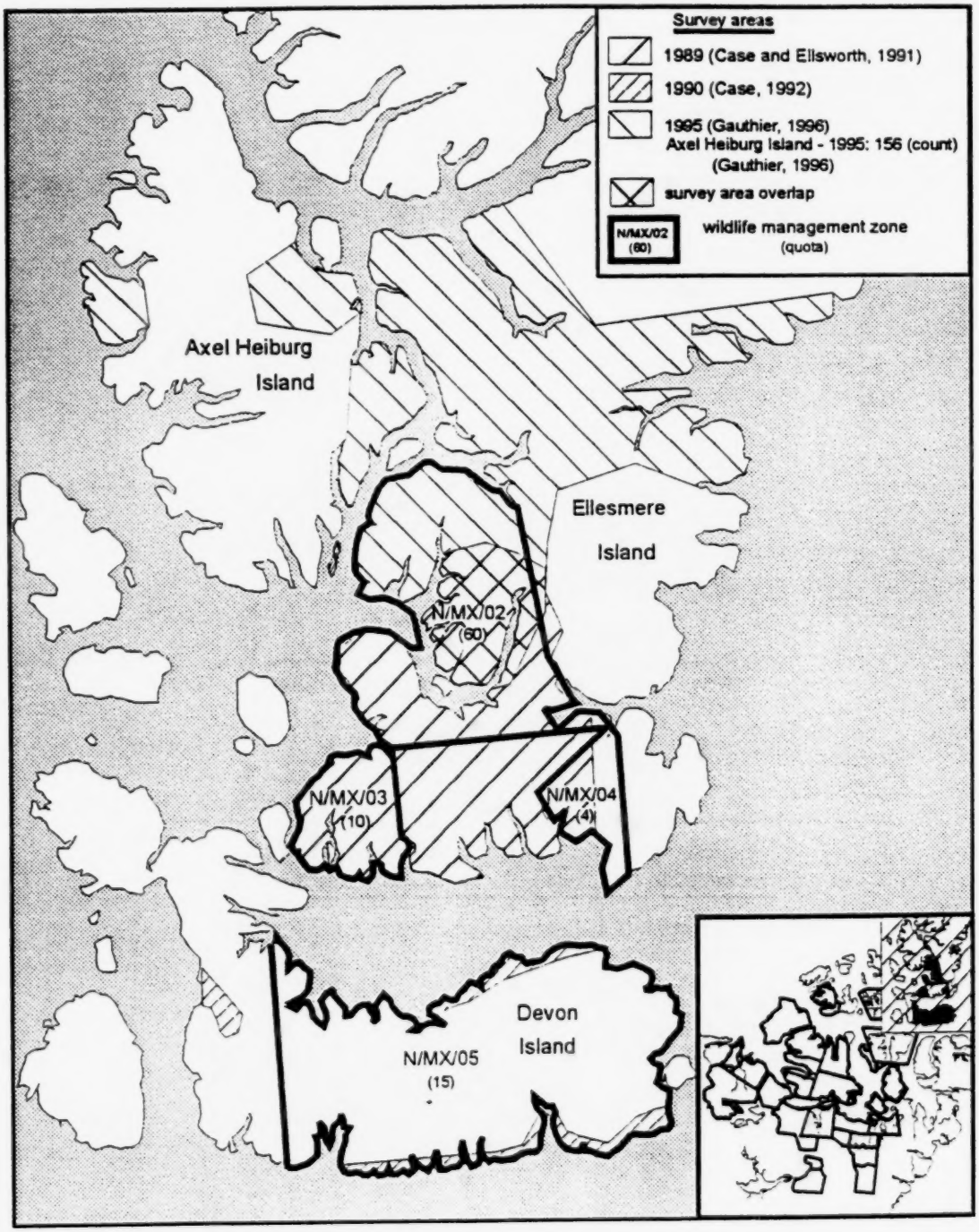
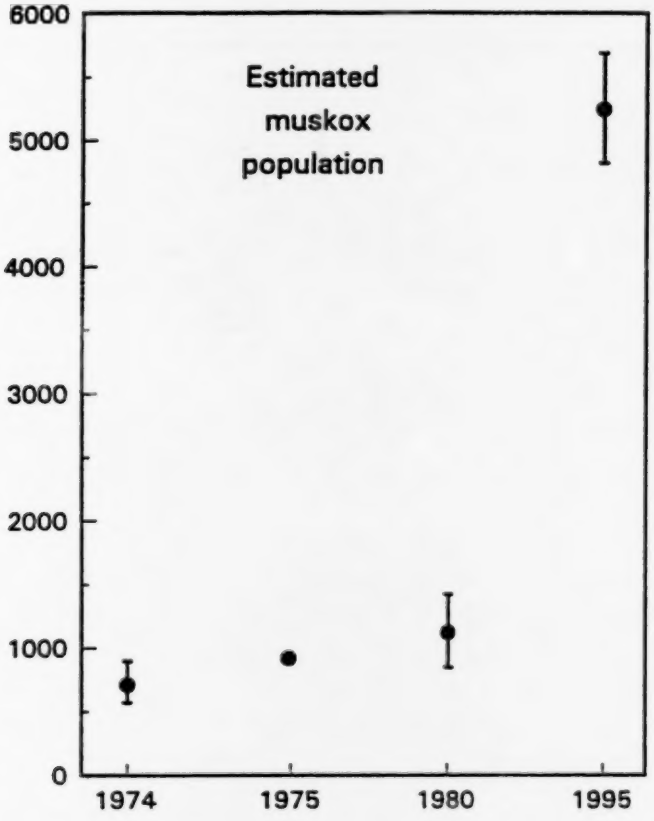


Figure 20. Ellesmere, Axel Heiburg, and Devon islands survey areas.

Prince of Wales Island



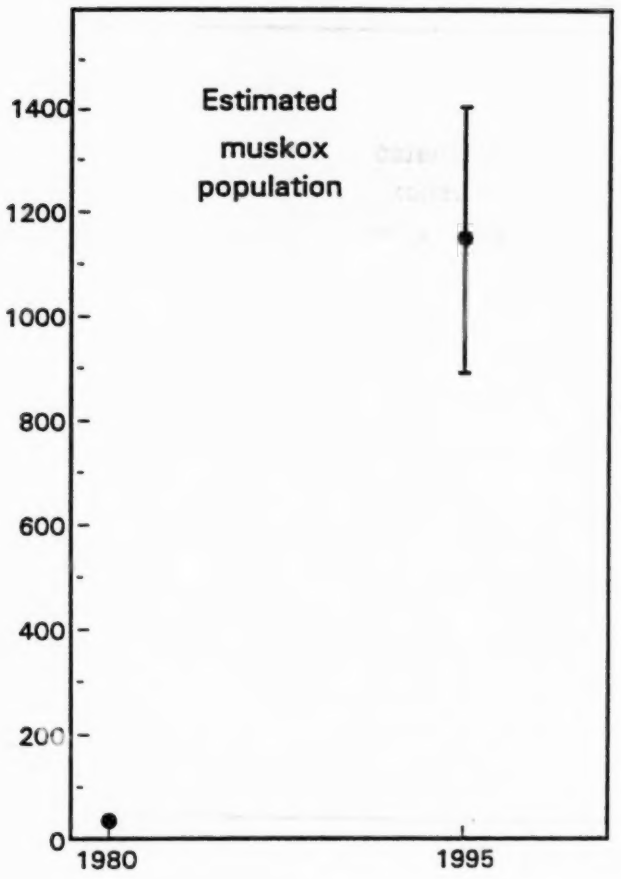
Muskox Management Zone - N/MX/06, N/MX/08
Quota: 20, 12

	Population estimate	S.E.	C.V.	% coverage	% calves
1974[1]	564-872	-	-	-	-
1975[1]	907	-	-	8.6	15
1980[2]	1126	276	0.25	21	-
1995[3]	5259	414	0.08		-

[1]Fischer and Duncan, 1976
[2]Gunn and Decker, 1984
[3]Gunn and Dragon, in press

Figure 21. Prince of Wales Island muskox population trend.

Somerset Island



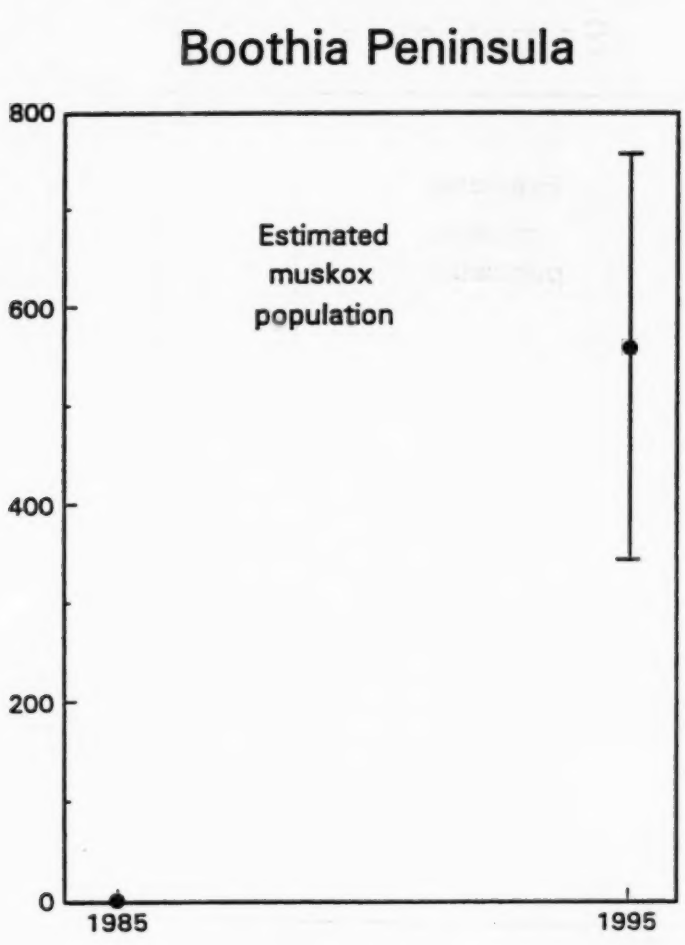
Muskox Management Zone - N/MX/06
Quota: 20

	Population estimate	S.E.	C.V.	% coverage	% calves
1980[1]	29	-	-	9-34	-
1995[2]	1140	260	0.23	2.2	-

[1]Gunn and Decker, 1984

[2]Gunn and Dragon, in press.

Figure 22. Somerset Island muskox population trend.



Muskox Management Zone - N/MX/09
Quota: 10

	Population estimate	S.E.	C.V.	% coverage	% calves
1985[1]	0	-	-	10-20	-
1995[2]	555	205	0.37	9.2	0.03

[1]Gunn and Ashevak, 1990
[2]Gunn and Dragon, in press

Figure 23. Boothia Peninsula muskox population trend.

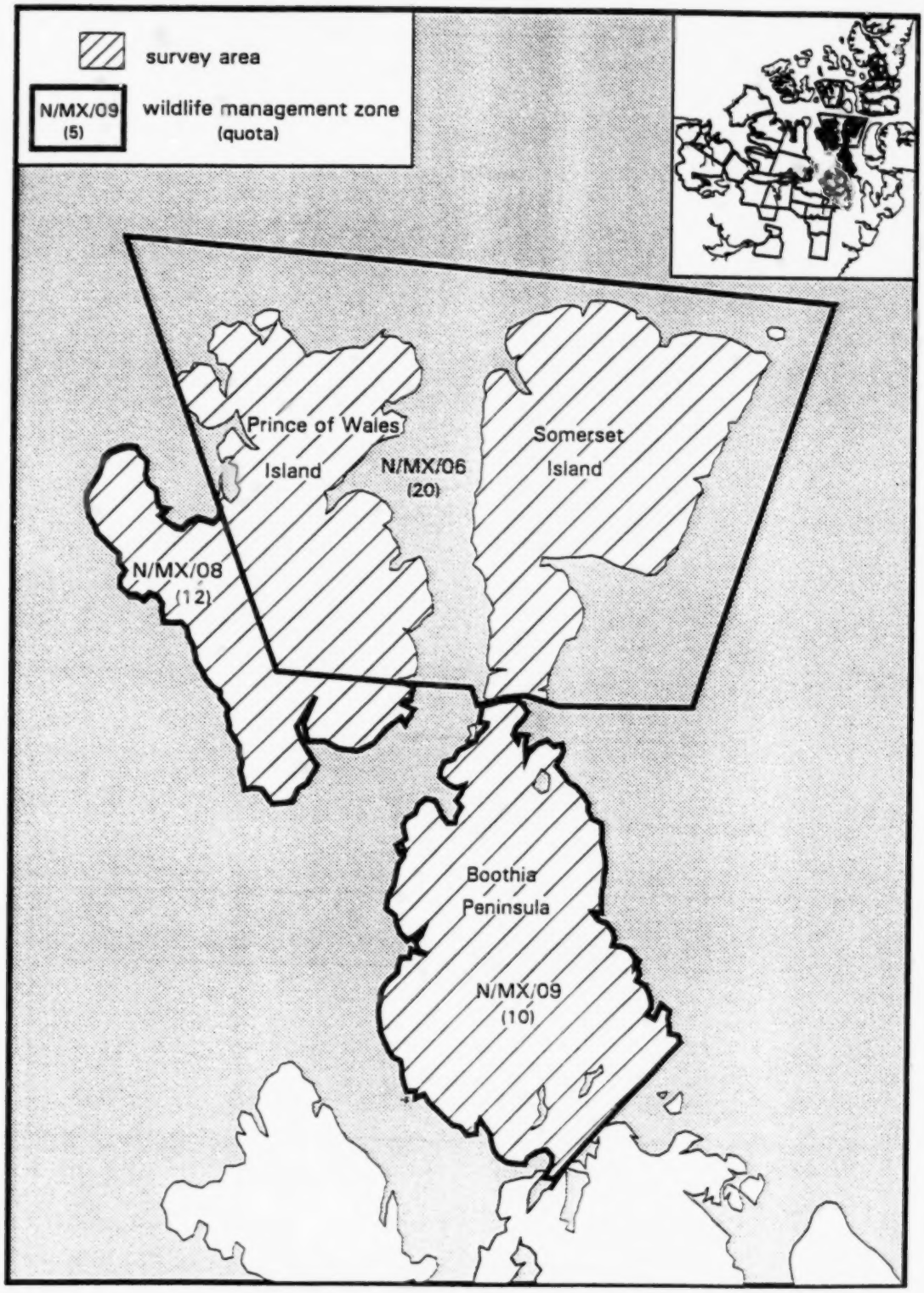
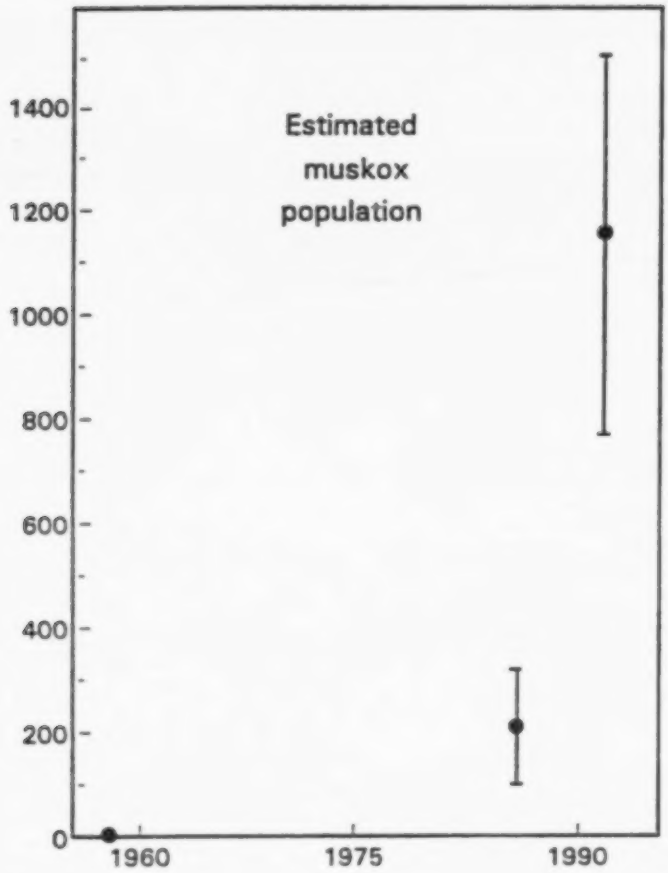


Figure 24. Boothia Peninsula, Prince of Wales and Somerset islands survey areas.

Adelaide Peninsula



Muskox Management Zone - N/MX/17
Quota: 55

	Population estimate	S.E.	C.V.	% coverage	% calves
1957 [1]	0	-	-	-	-
1986 [2]	213	125	0.59	20	17.1
1992 [2]	1165	380	0.33	20	6.6

[1]Macpherson and Manning, 1959
[2]Gunn et al., 1996

Figure 25. Adelaide Peninsula muskox population trend.

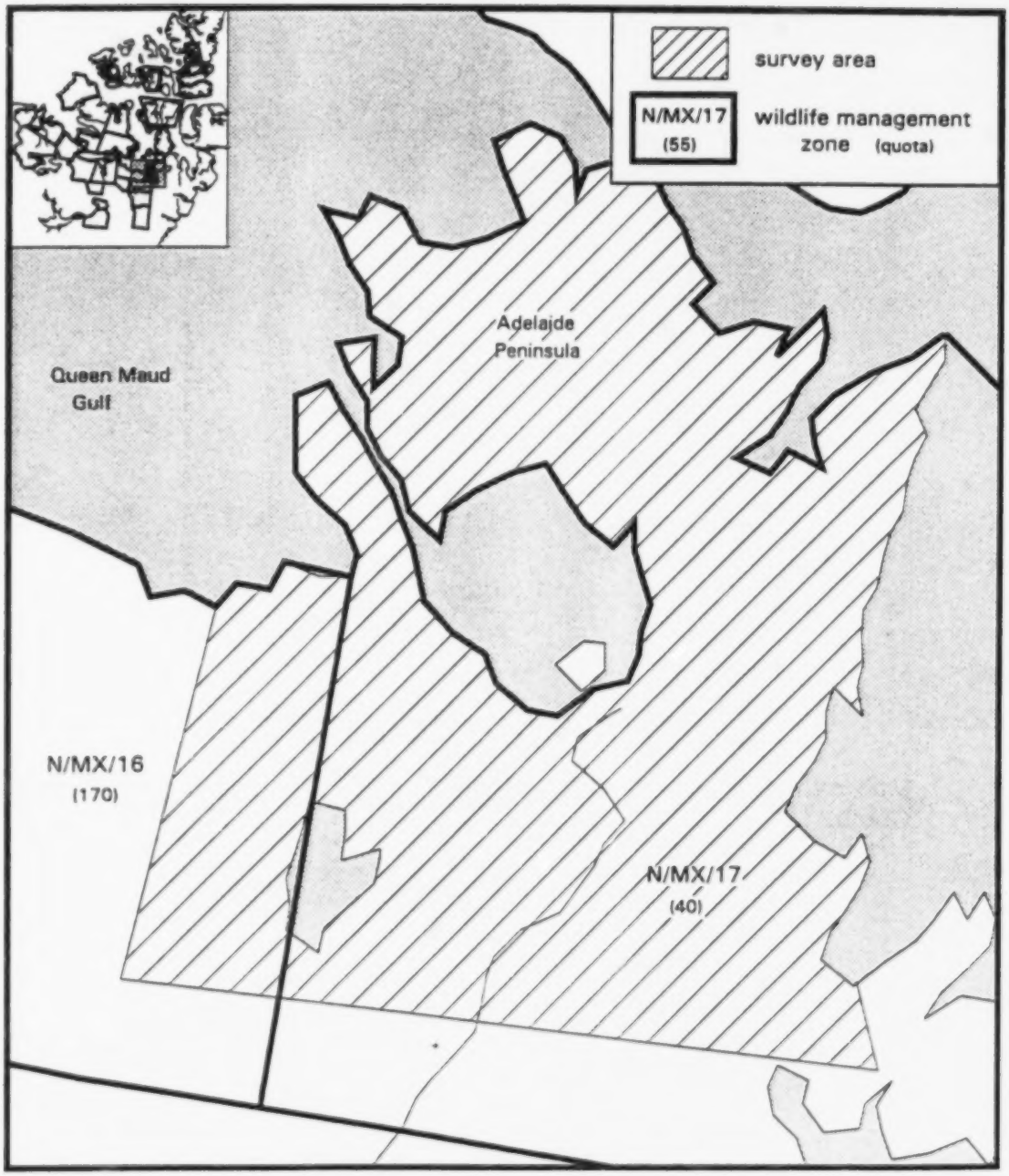
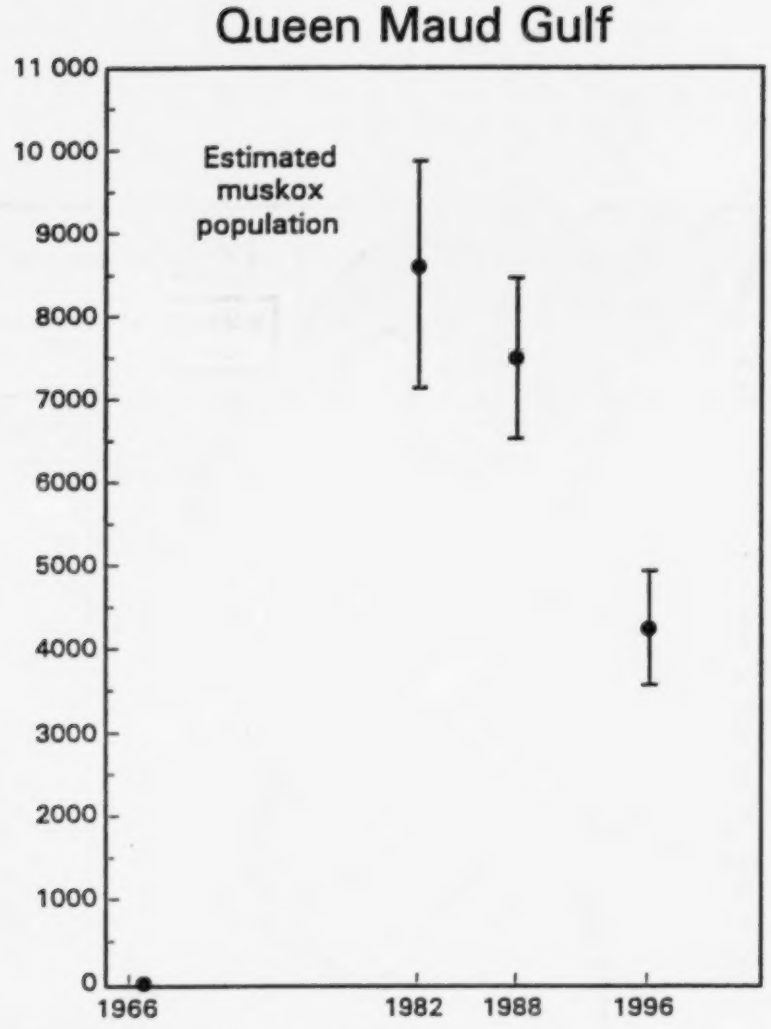


Figure 26. Adelaide Peninsula survey area, 1986 and 1992.



Muskox Management Zone - N/MX/16
Quota: 170

	Population estimate	S.E.	C.V.	% coverage	% calves
1966[1]	0	-	-	-	-
1982[2]	8535	1381	0.23	3-70	13.5
1988[3]	7450	970	0.13	20	10.9
1996[4]	4255	680	0.16	20-30.6	-

[1]T.W. Barry, pers. comm. (in Gunn and Case, 1984)
[2]Gunn and Case, 1984 - combined transect & block survey
[3]Gunn and Case, in prep.
[4]Nishi, in prep.

Figure 27. Queen Maud Gulf muskox population trend.

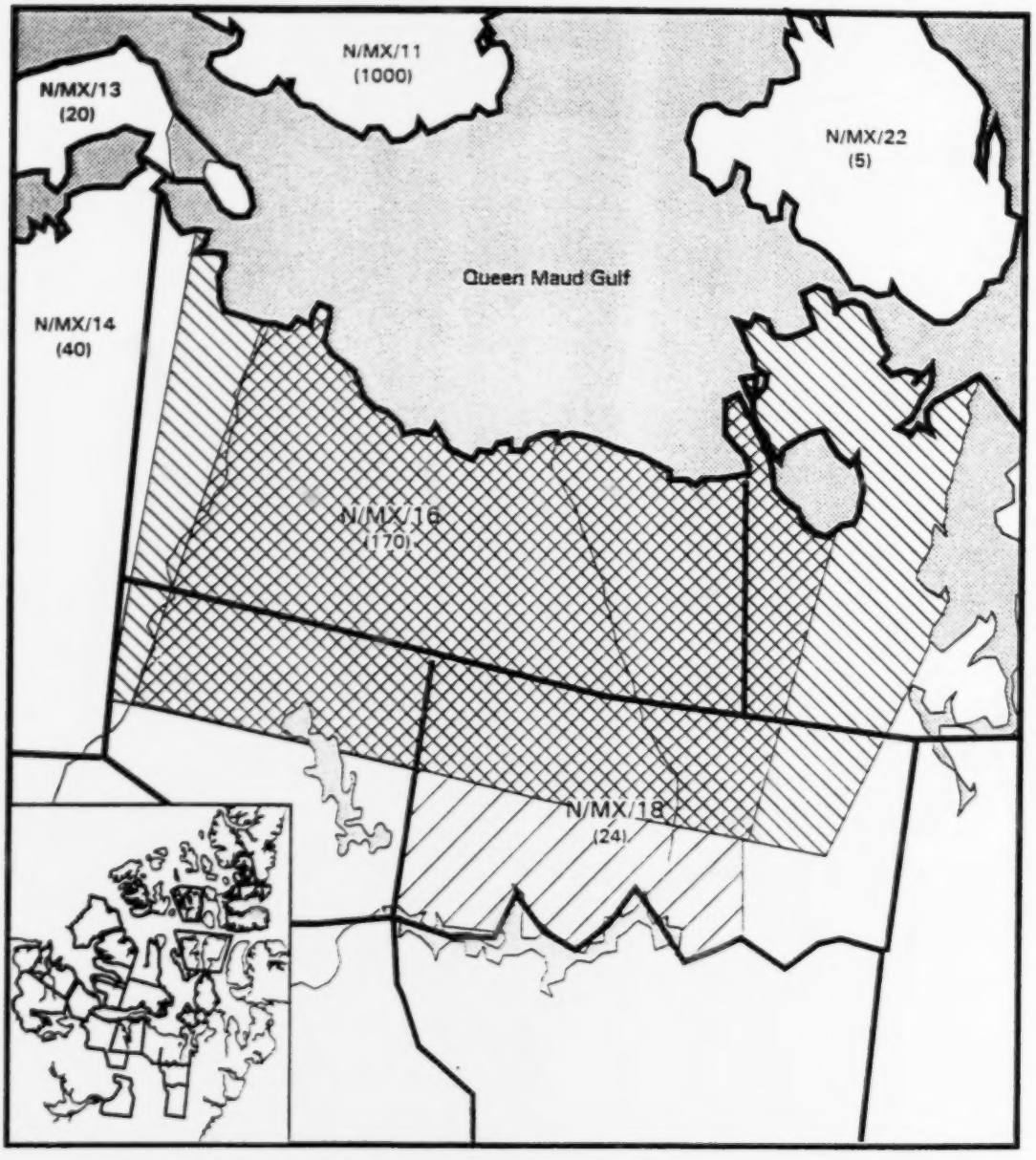
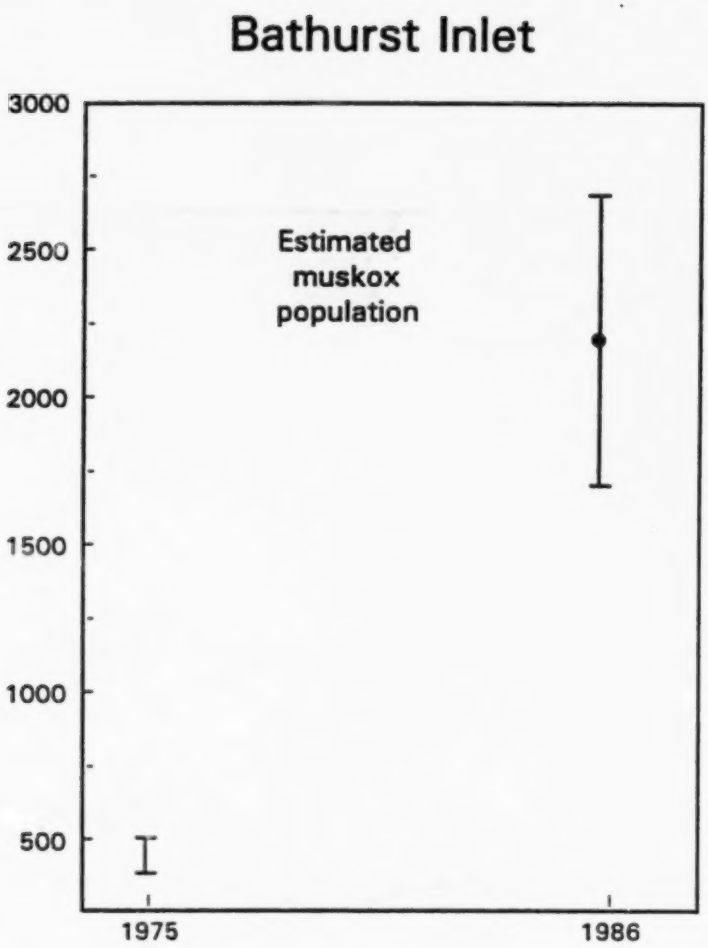


Figure 28. Queen Maud Gulf survey areas.



Muskox Management Zone - N/MX/14
Quota: 40

	Population estimate	S.E.	C.V.	% coverage	% calves
1975[1]	400-500	-	-	-	8.0
1986[2]	2192	494	0.14	-	12.0

[1]Kingsley, 1979
[2]Gunn, 1990

Figure 29. Bathurst Inlet muskox population trend.

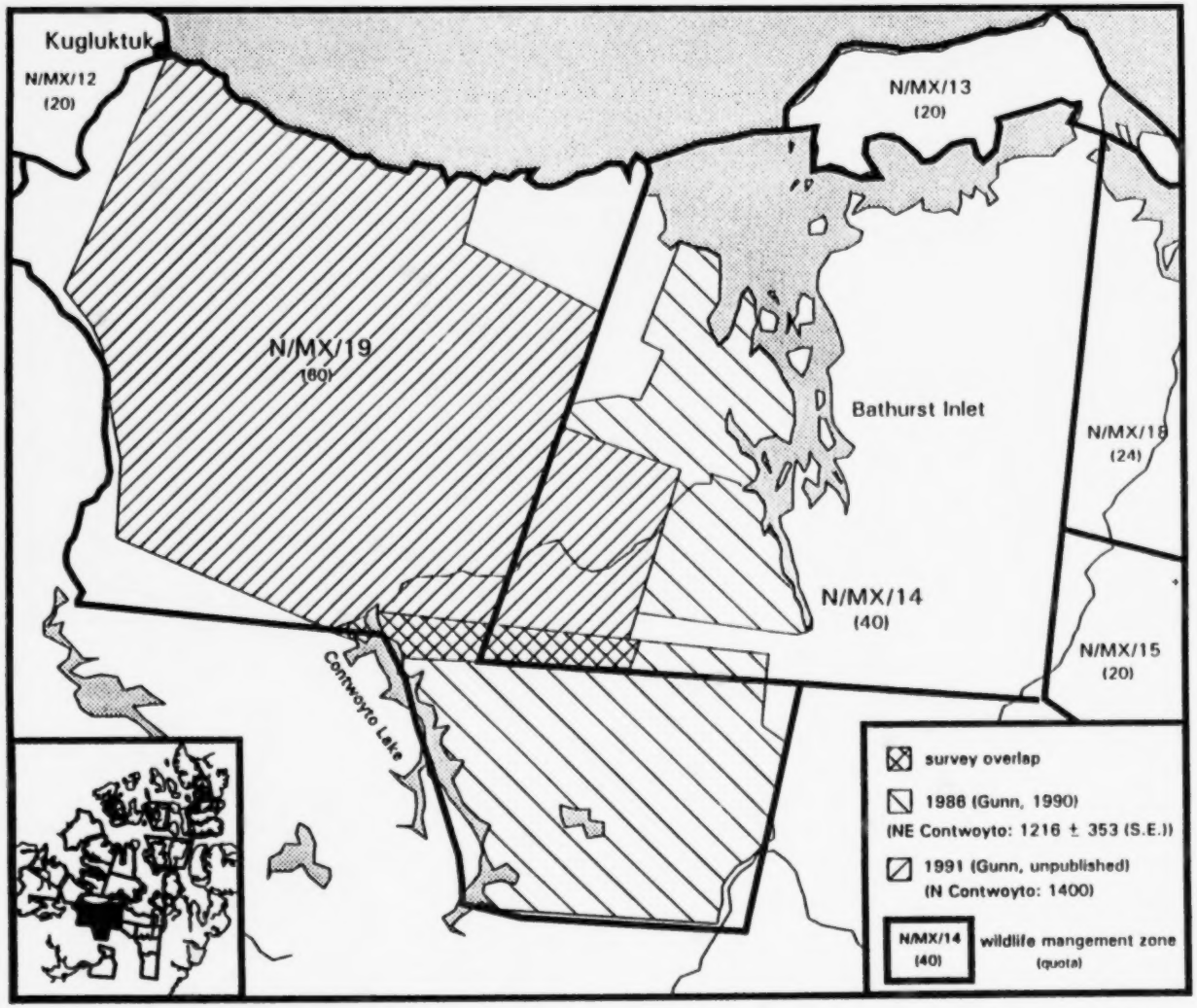
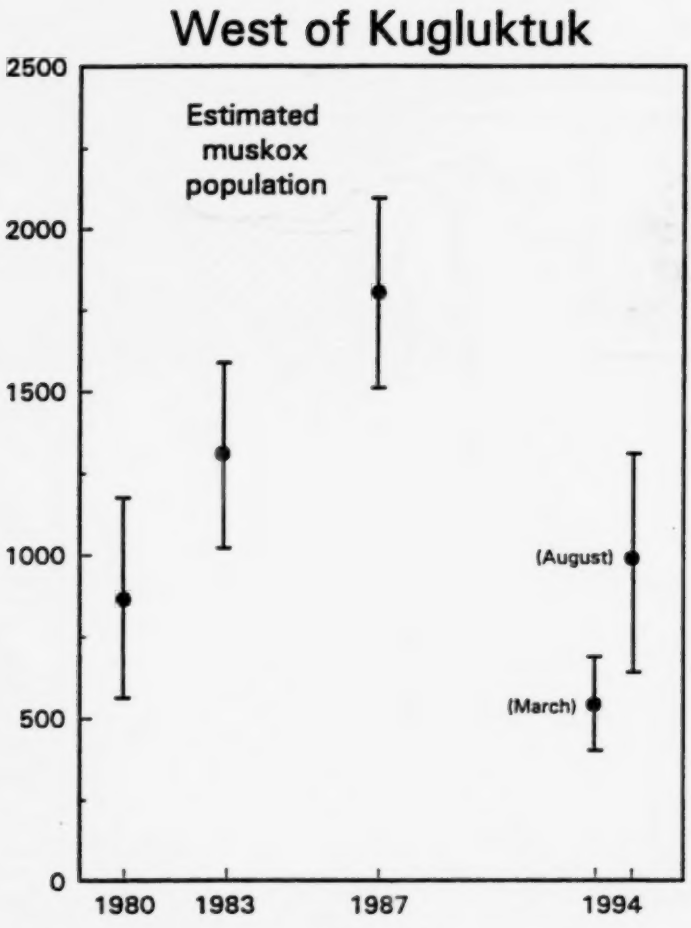


Figure 30. Bathurst Inlet and North Contwoyto survey areas and population estimates.



Muskox Management Zone - N/MX/12
Quota: 20

	Population estimate	S.E.	C.V.	% coverage	% calves
1980[1]	869	300	0.35	19	-
1983[2]	1295	279	0.22	24.7	-
1987[3]	1800	290	0.33	11-48	20.5
1994[4]	540	139	0.26	30	-
1994[5]	974	336	0.34	10-19.5	-

[1]Carruthers and Jakimchuk, 1981
[2]Case and Poole, 1985 - part of a larger survey
[3]Gunn, 1995
[4]Nishi, in prep.c.- March 1994 survey
[5]Nishi, in prep.c.- August 1994 survey

Figure 31. West of Kugluktuk muskox population trend.

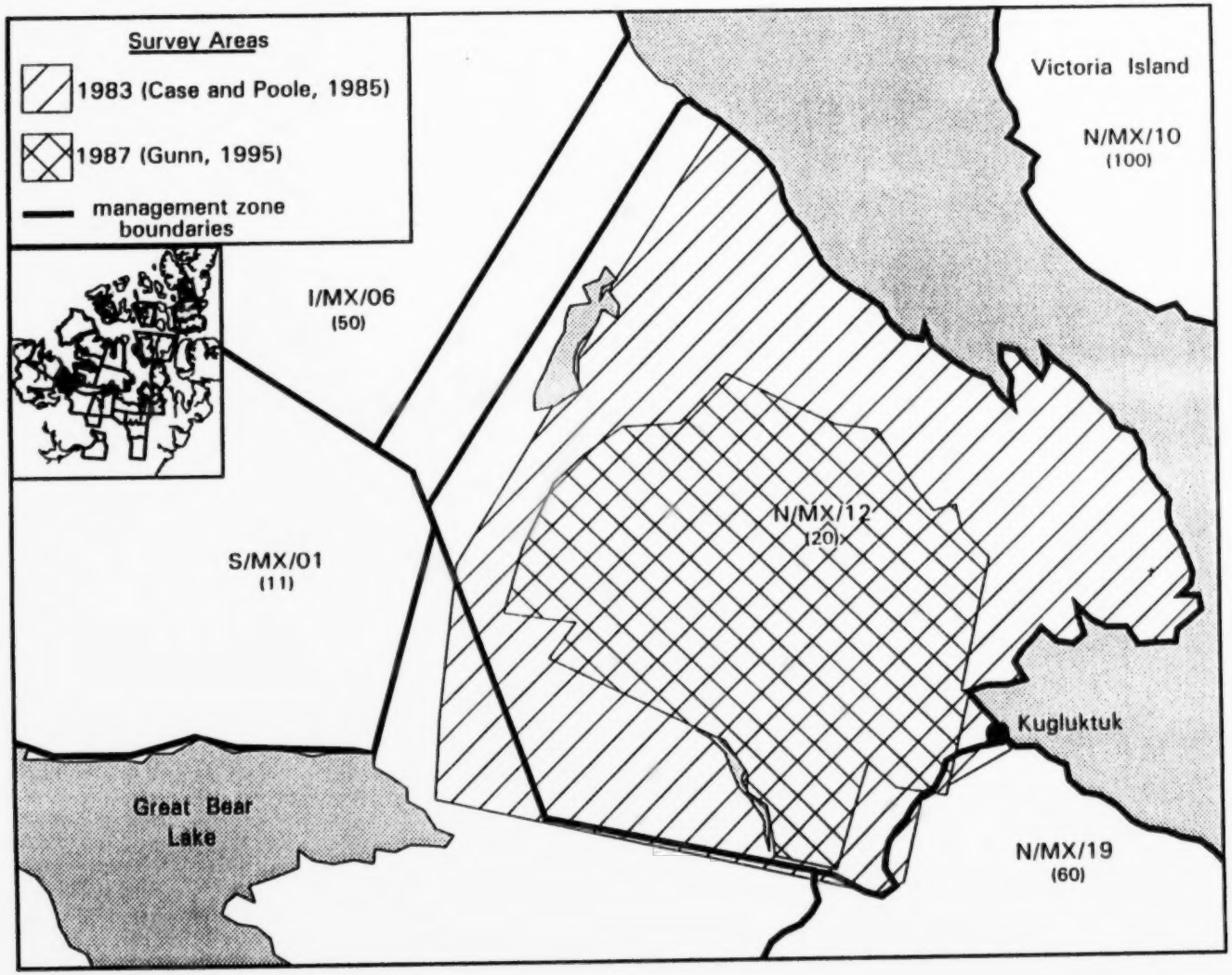
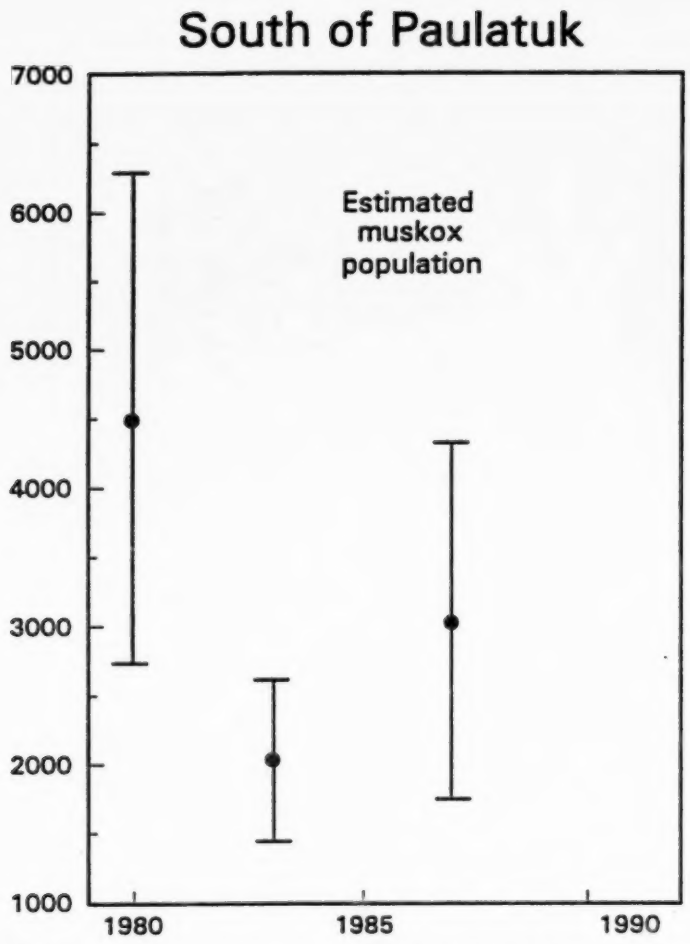


Figure 32. West of Kugluktuk survey areas.



Muskox Management Zone - I/MX/06, I/MX/05
Quota: 50,25

	Population estimate	S.E.	C.V.	% coverage
1980[1]	4502	1768	0.39	-
1983[2]	2020	560	0.27	25.6
1987[3]	3040	1296	0.42	10

[1] Spencer, 1980

[2] Case and Poole, 1985 - part of a larger survey

[3] McLean, 1992

Figure 33. South Paulatuk area muskox population trend.

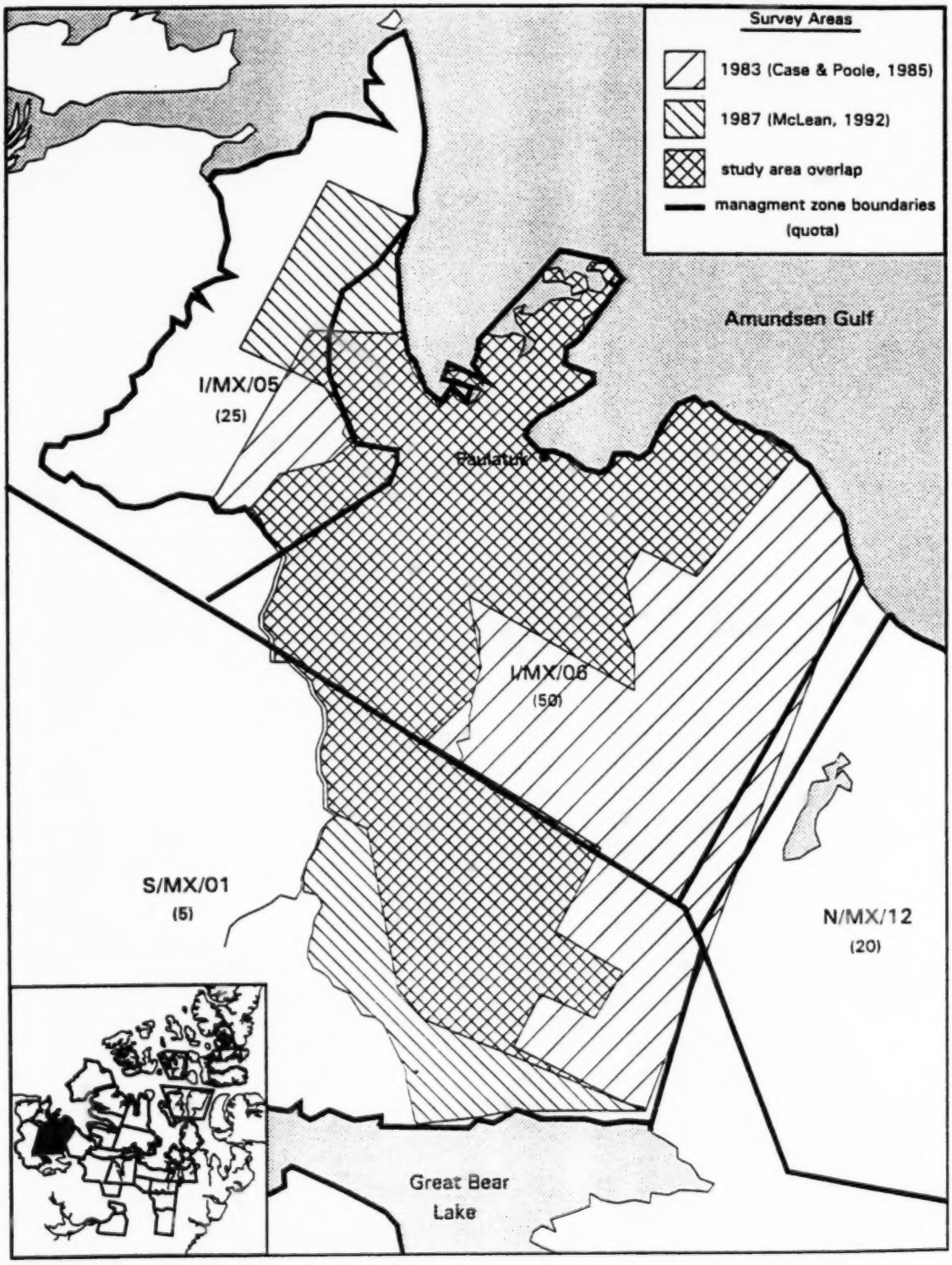
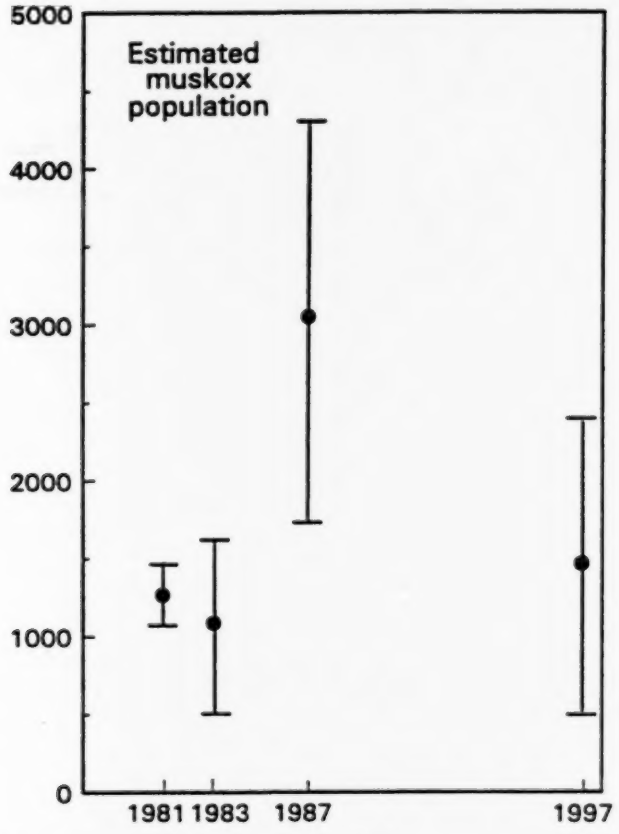


Figure 34. Surveys south of Paulatuk.

Northern Sahtu Settlement Area



Muskox Management Zone - S/MX/01
Quota: 11

	Population estimate	S.E.	C.V.	% coverage
1981[1]	1223	168	0.14	11.4
1983[2]	1083*	553	0.51	-
1987[3]	3040	1296	0.42	10
1997[4]	1457	919	0.63	10

[1] Carruthers and Jakimchuk, 1981

[2] Case and Poole, 1985

[3] McLean, 1992 - part of a larger survey

[4] Veitch, in press

* high density area estimate

Figure 35. Northern Sahtu Settlement Area population trend.

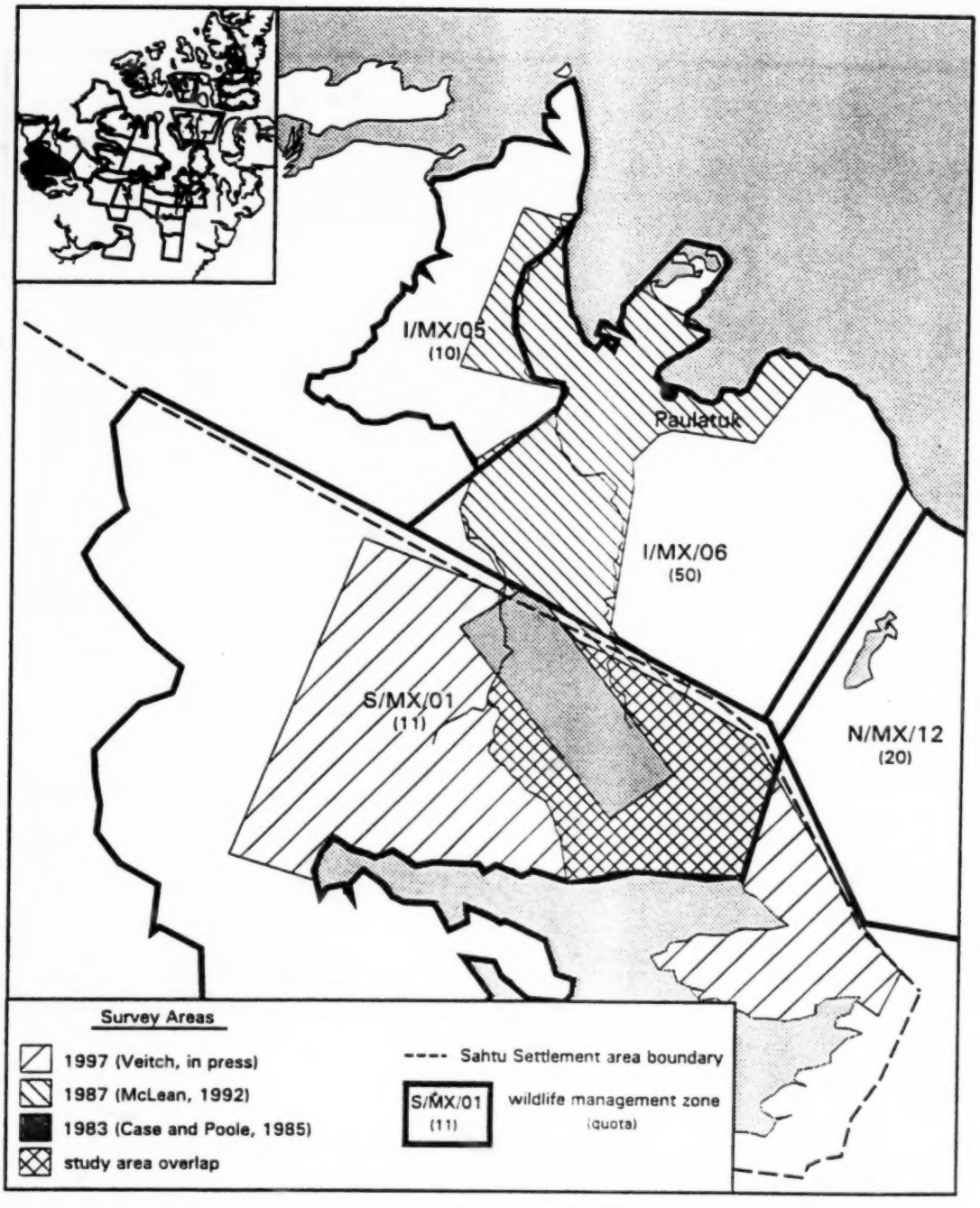


Figure 36. Sahtu Settlement region survey areas.

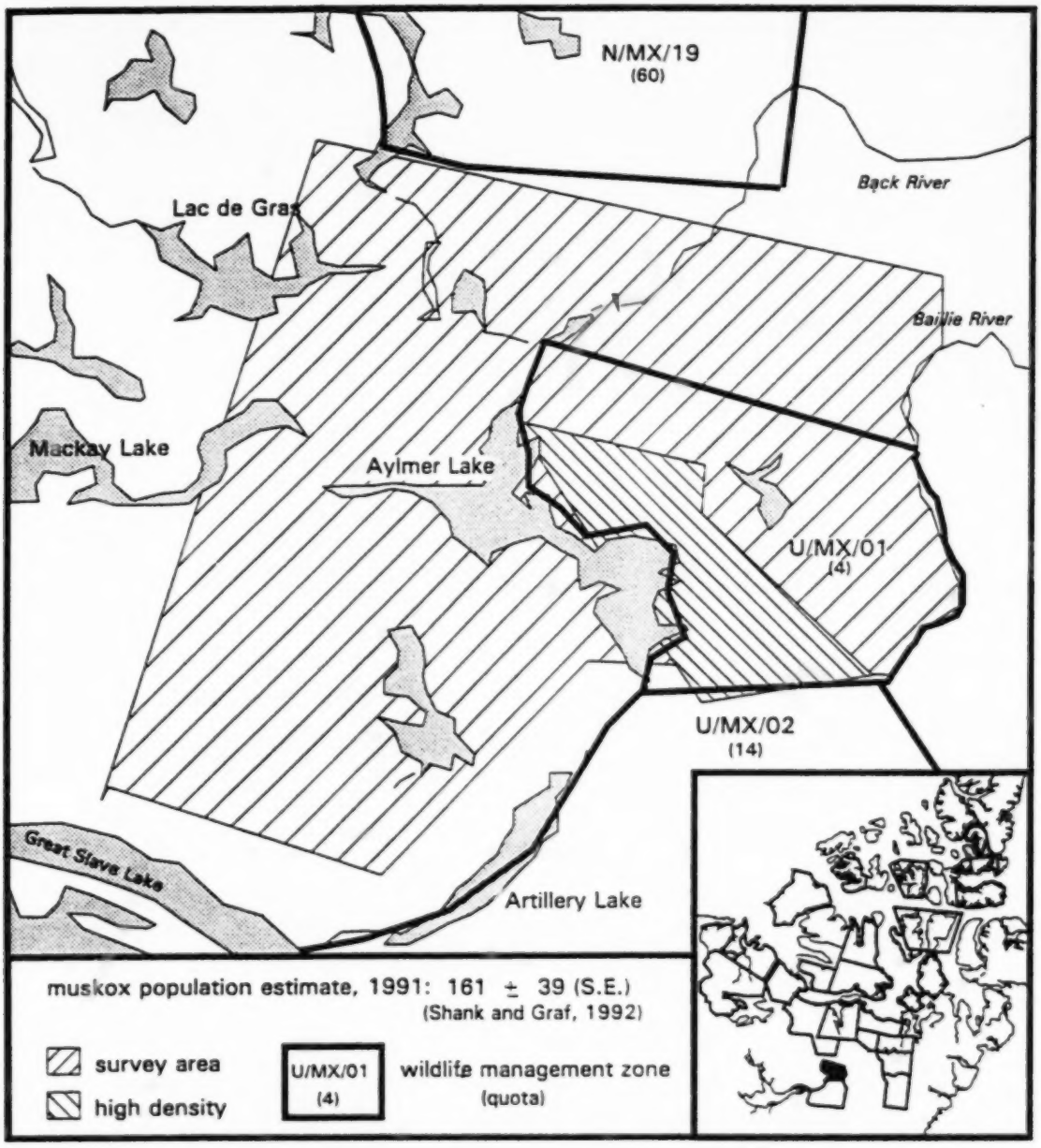


Figure 37. Aylmer Lake survey area and population estimate, July 1991.

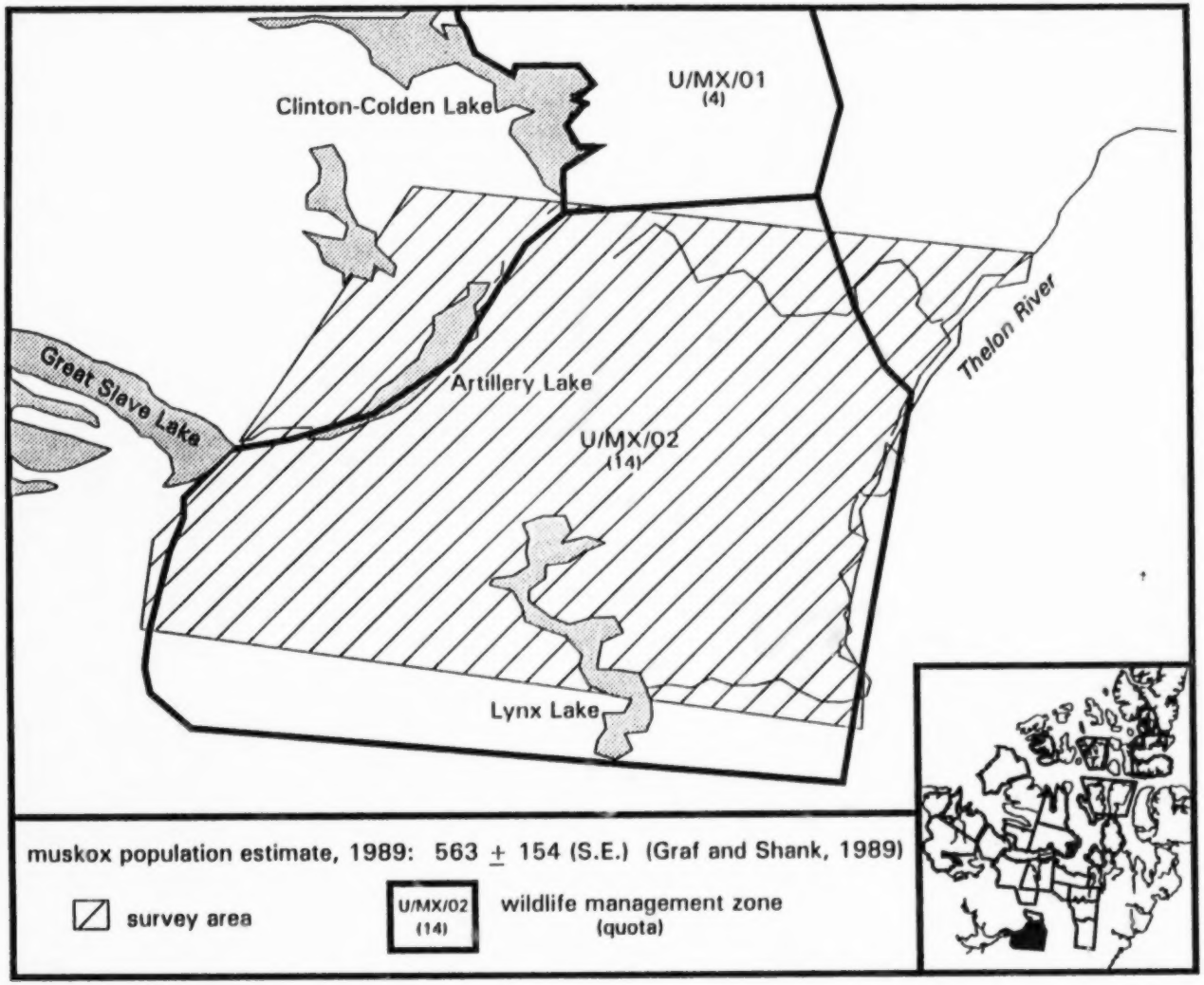
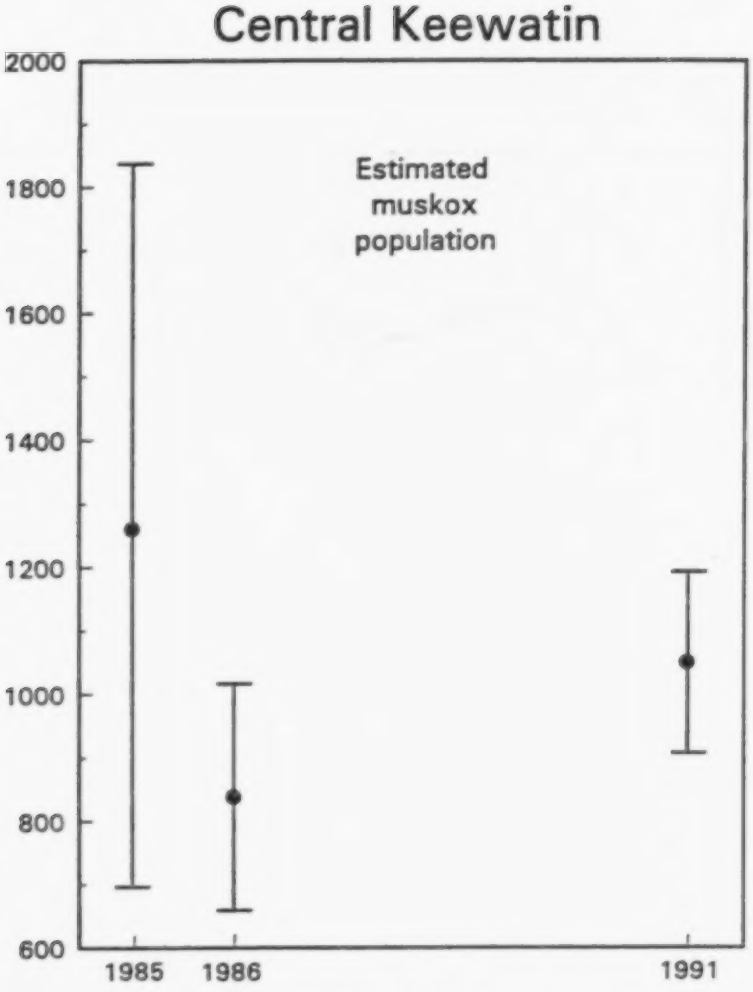


Figure 38. Artillery Lake survey area and population estimate, March 1989.



Muskox Management Zone - N/MX/21
Quota: 25

	Population estimate	S.E.	C.V.	% coverage	% calves
1985 [1]	1262	563	0.45	15	17.9
1986 [2]	838	176	0.21	16-50	11.5
1991 [3]	1048	141	0.13	16-50	15.7

[1]Case and Graf, 1986

[2]Graf et al., 1990 - survey area was larger, but overlapped the 1985 survey.

[3]Mulders, in prep. - same survey area as in 1986.

Figure 39. Central Keewatin muskox population trend.

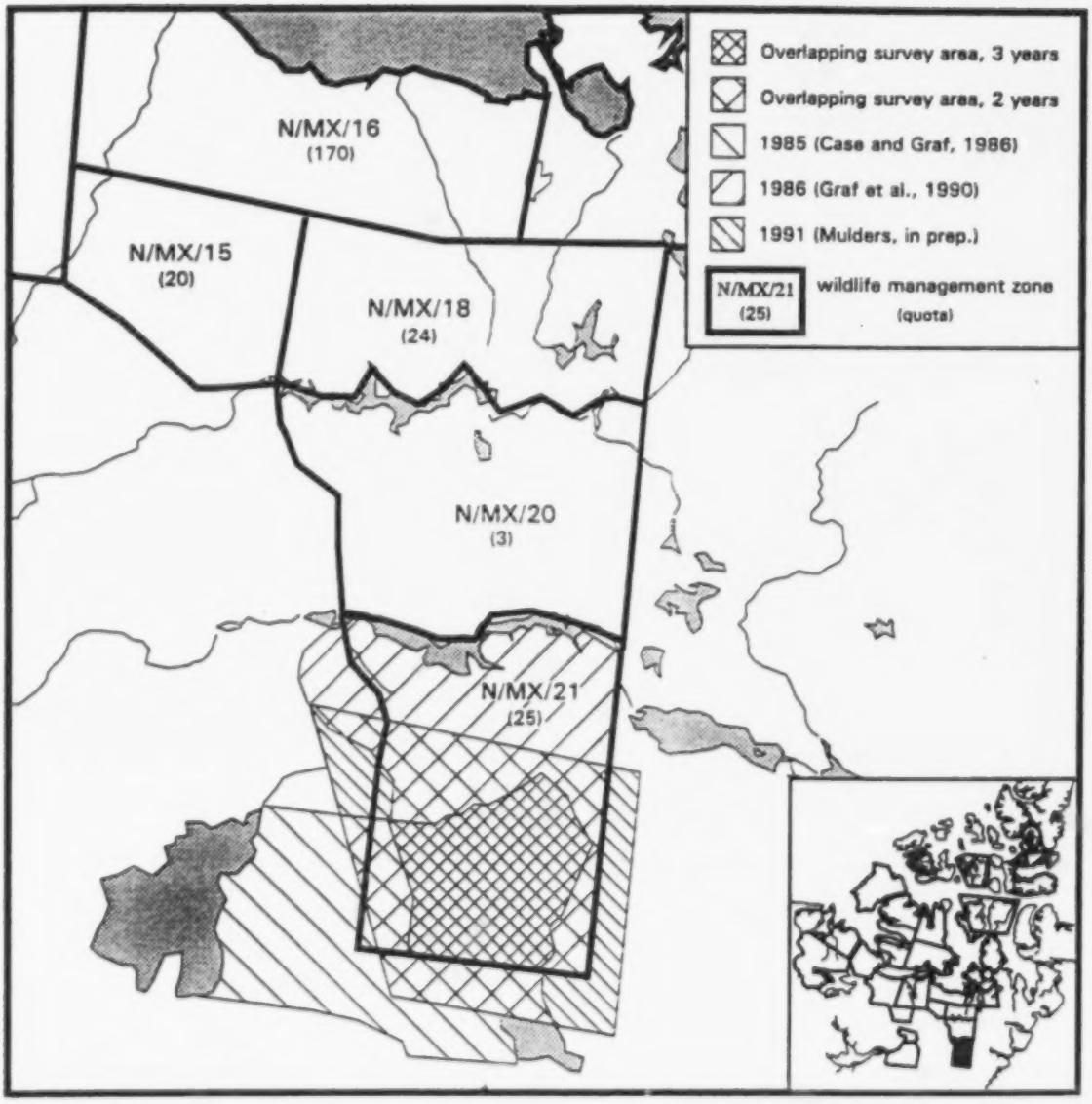
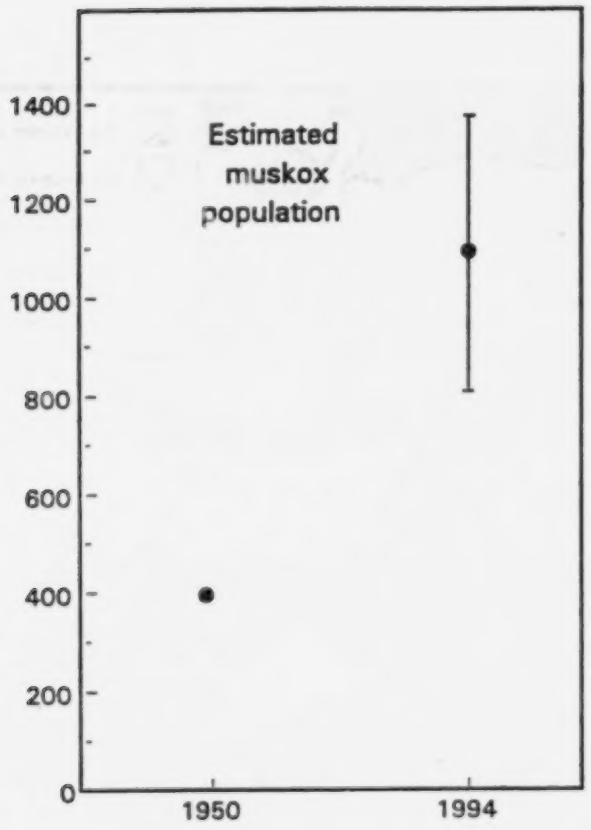


Figure 40. Central Keewatin survey areas.

Thelon Game Sanctuary



	Population estimate	S.E.	C.V.	% coverage	% calves
1950 [1]	400	-	-	-	-
1994 [2]	1095	281	0.26	13.3	12.2-18.8

[1]Tener, 1958

[2]Shank, pers. comm. (unpubl. data)

Figure 41. Thelon Game Sanctuary muskox population trend.

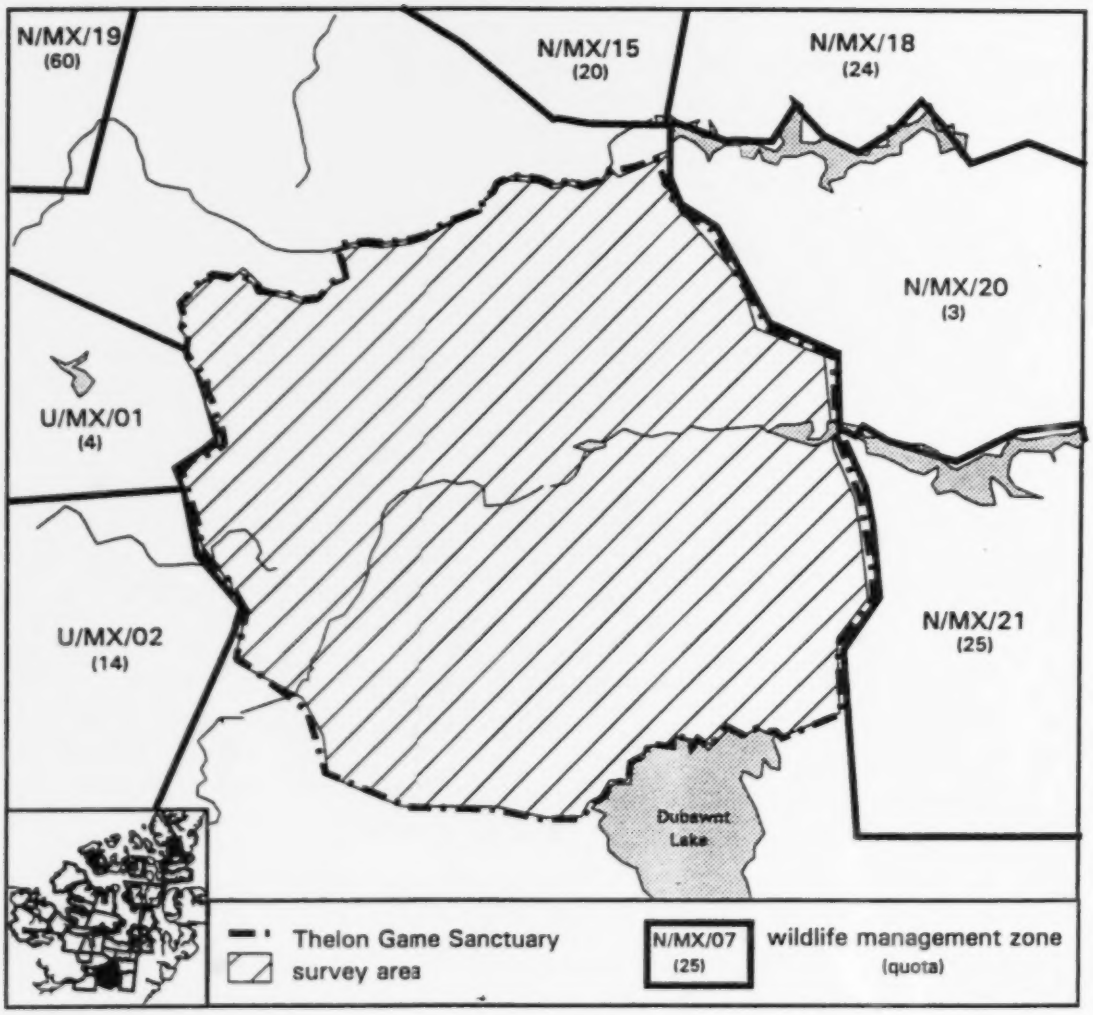


Figure 42. Thelon Game Sanctuary survey area, 1994.

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APPENDIX A. Muskox quotas in the Northwest Territories

Wildlife * Management Zone	Quota	Community
I/MX/01 (A/1-5M)	6	Sachs Harbour, Holman
I/MX/02 (B/1-1m)	10000	Sachs Harbour
I/MX/03 (B/2-2m)	250	Holman
I/MX/04 (B/2-5m)	750	Holman
I/MX/05 (C/1-3m)	25	Tuktoyaktuk
I/MX/06 (C/2-2m)	50 (30♂,20♀)	Paulatuk
N/MX/01 (A/2-1)	40	Resolute Bay
N/MX/02 (A/1-1)	60	Grise Fiord
N/MX/03 (A/1-2)	10 (5♂,5♂/♀)	Grise Fiord
N/MX/04 (A/1-6)	4 (2♂,2♂/♀)	Grise Fiord
N/MX/05 (A/1-3)	15 (8♂,7♂/♀)	Arctic Bay, Grise Fiord, Resolute Bay
N/MX/06 (A/3-1)	20	Resolute Bay
N/MX/07 (B/2-3)	100	Cambridge Bay
N/MX/08 (B/3-1)	12	Taloyoak
N/MX/09 (B/3-2)	10	Taloyoak
N/MX/10 (B/2-1)	100	Kugluktuk
N/MX/11 (B/2-4)	1000	Cambridge Bay
N/MX/12 (C/1-1)	20	Kugluktuk
N/MX/13 (B/2-5)	20	Bay Chimo
N/MX/14 (F/2-1)	40	Bathurst Inlet, Bay Chimo
N/MX/15 (F/2-4)	20	Bathurst Inlet, Bay Chimo
N/MX/16 (H/1-1)	170	Cambridge Bay, Gjoa Haven, Pelly Bay, Taloyoak

* The zone names in brackets were used prior to December 1996.

APPENDIX A. cont'd.

Wildlife * Management Zone	Quota	Community
N/MX/17 (H/1-2)	55	Gjoa Haven, Pelly Bay, Taloyoak
N/MX/18 (H/1-3)	24	Coral Harbour, Repulse Bay, Baker Lake
N/MX/19 (F/2-2)	60	Bathurst Inlet, Bay Chimo, Kugluktuk
N/MX/20 (H/1-4)	3	Baker Lake
N/MX/21 (J/1-1)	25	Baker Lake, Arviat, Chesterfield Inlet, Rankin Inlet, Whale Cove
N/MX/22	5	Gjoa Haven
S/MX/01 (C/1-2)	11	Deline, Colville Lake, Ft. Good Hope, 1 resident
U/MX/01 (F/2-3)	4	Lutsel K'e, Yellowknife
U/MX/02 (H/3-1)	14	Lutsel K'e

* The zone names in brackets were used prior to December 1996.